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contents

WINTER 2022/2023

features

IN *KON-TIKI*'S WAKE: A 75TH ANNIVERSARY CELEBRATION

Part 1: Thor Heyerdahl, the changemaker

by SYLVIA A. EARLE

14

Part 2: Thor Heyerdahl's Polynesian legacy

by SONIA HAOA CARDINALI

22

IN SEARCH OF THE SACRED

finding meaning in Earth's last wild places

by CHRIS RAINIER

32

OWLS OF THE ARCTIC CIRCLE

documenting one man's quest to preserve a fragile ecosystem

by JAMES MAXWELL LOWE

44

THE SERPENT AND THE FROG

searching for the Temple of Ausangate

by PRESTON SOWELL

54

THE WILD WATERS OF THE WINISK

canoeing the Canadian outback

by WILLIAM N. ROM

68

regulars

PRESIDENT'S LETTER
4

EDITOR'S NOTE
6

EXPLORATION NEWS
10

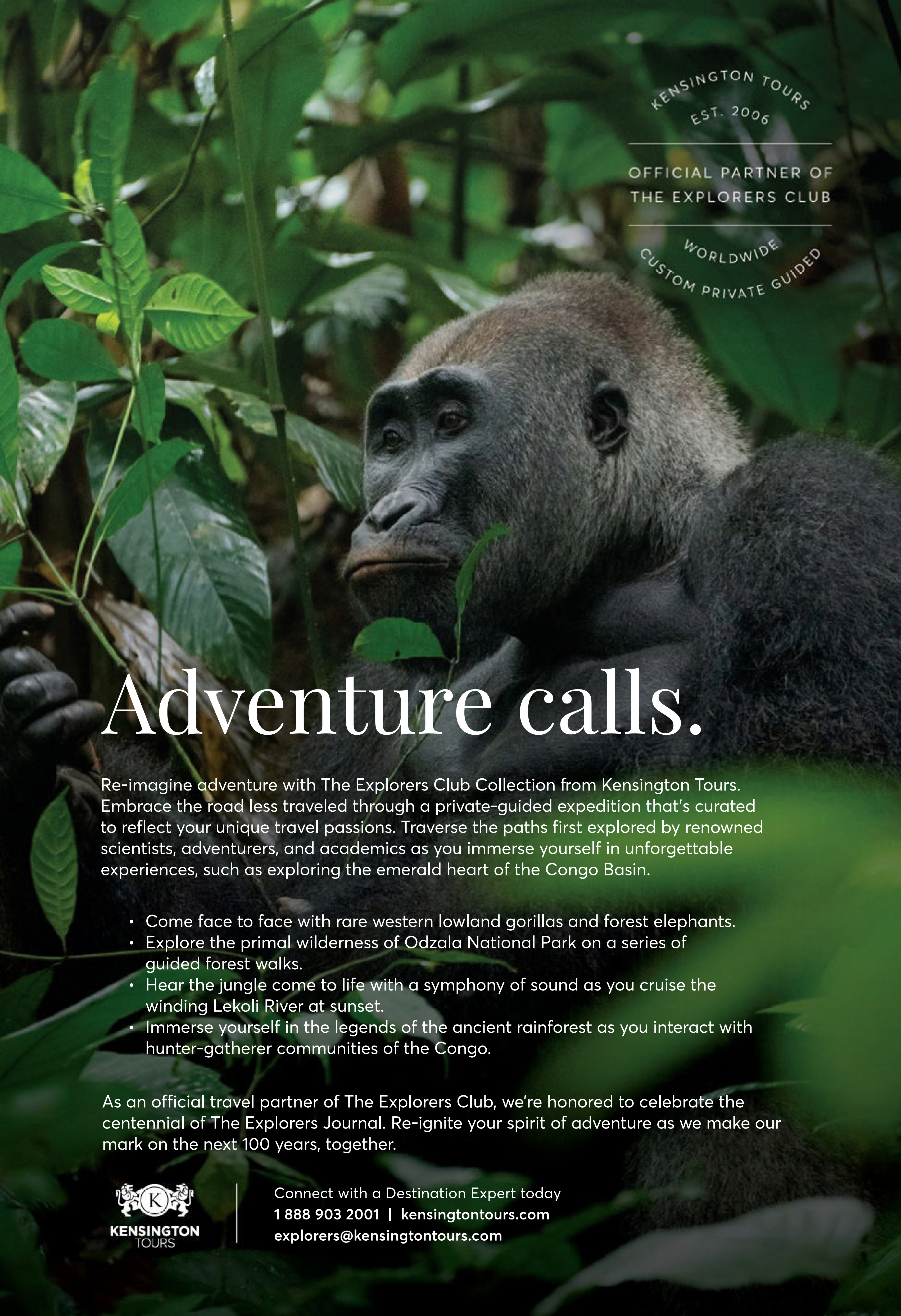
HARVESTING THE WILD
78

EXTREME MEDICINE
80

REVIEWS
82

WHAT WERE THEY THINKING?
88

A SOUTH SRI LANKAN DANCER WEARS A NAGA *RAKSHA* MASK. PHOTOGRAPH BY CHRIS RAINIER.



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president's letter

exploring new worlds

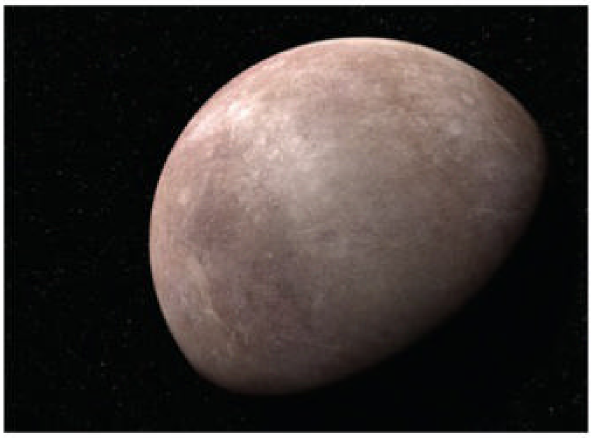
RICHARD GARRIOTT DE CAYEUX
President

As of February 1, according to NASA, we know of 5,307 confirmed exoplanets—both gaseous and rocky—and there are surely many billions more across our galaxy, and ours is but one of many billions of galaxies in the visible universe. It is an exciting time to be looking up into space!

In our quest to find life beyond the Earth, gathering data about the atmospheres of rocky exoplanets located in in the so-called "Goldilocks zone" of their host stars, where liquid water might exist, could be very revealing. Just in the past decade or so, we have begun to tease out data from the light of a star that passes through an exoplanet's atmosphere, which has allowed us to observe polarization and photon emission from chemicals in exoplanet atmospheres.

Now that we have a great new observatory in the sky—the James Webb Space Telescope (JWST)—the pace of discovery of these distant worlds is sure to accelerate, as evidenced by what wonderment has been found since its launch last year. Not only has the JWST already imaged the four oldest and most distant known galaxies in the visible universe, it has allowed a planet orbiting a star in the Virgo cluster, 65 million light-years from us, to become the most explored planet outside our solar system, and has found rings around a small icy exoplanet. JWST has also discovered "sandy clouds" seen in direct images of young brown dwarfs and has done detailed spectral analyses of light filtered through the atmospheres of known exoplanets, allowing us to see great detail in their chemical makeup! It has also detected hazy skies filled with clouds and water vapor.

I, for one, am looking forward to future exoplanet study, as we are sure to find numerable planets in their star's Goldilocks zone with liquid water. With our newest set of eyes in space, we are not only able to directly study the chemistry of their atmospheres, we will also be able to directly see if any of these atmospheres show signs of life, just as our own atmosphere does. Given that the number of rocky worlds with water is likely to be vast, I am very hopeful that we will find signs of life in the decades to come. Ad astra!



ON JANUARY 11, NASA ANNOUNCED THE DISCOVERY OF LHS 475 B, A ROCKY EXOPLANET ALMOST THE SIZE OF EARTH, FOUND ORBITING A RED DWARF SOME 41 LIGHT-YEARS AWAY IN THE CONSTELLATION OCTANS BY THE JAMES WEBB SPACE TELESCOPE. IMAGE COURTESY NASA, ESA, CSA, LEAH HUSTAK (STSCI).

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This photo was taken with a telephoto (zoom) lens and may appear closer to ice than we really were. We always keep a safe distance and follow mandated regulations.

editor's note

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ANGELA M.H. SCHUSTER
Editor-in-Chief

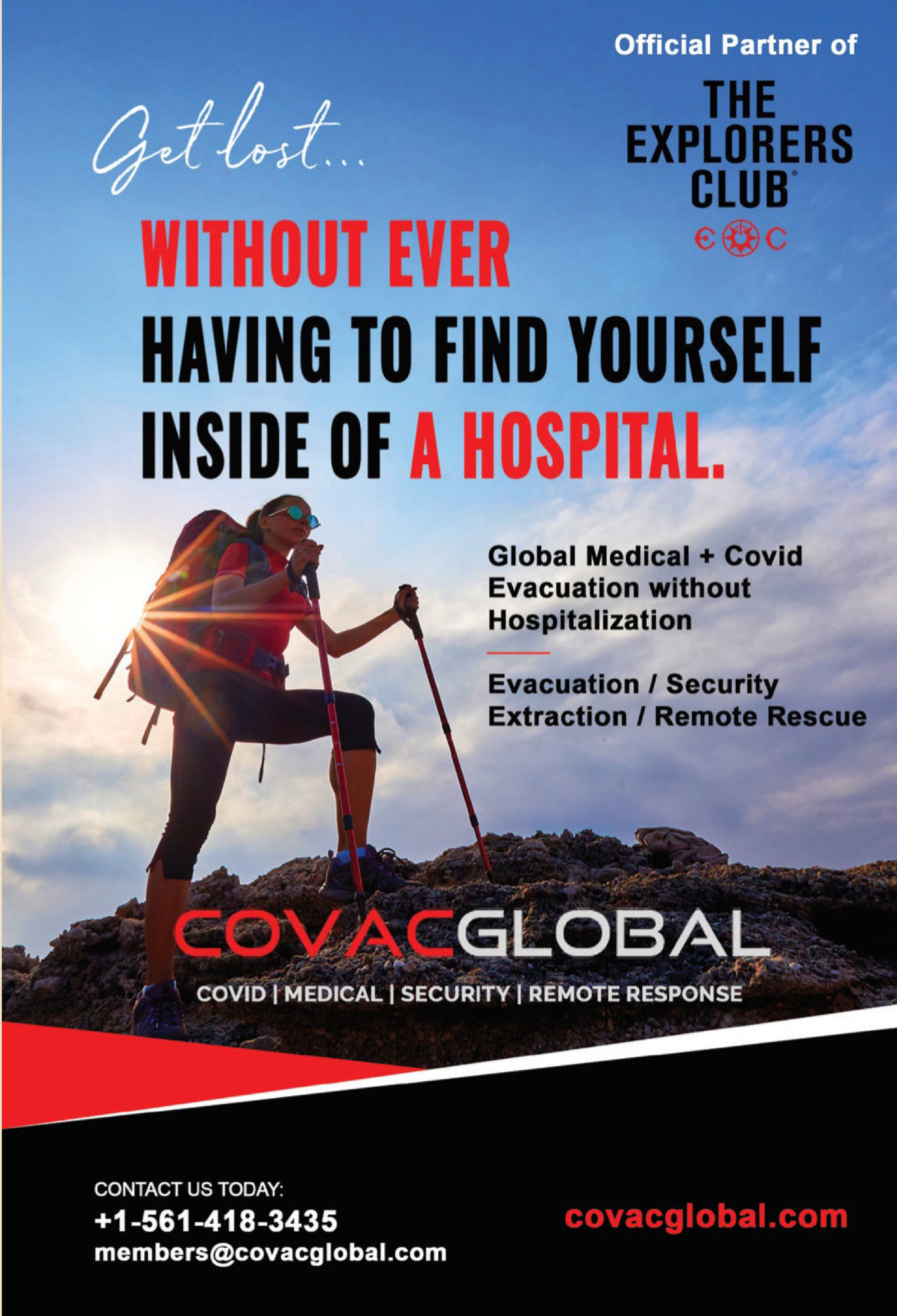
It has been 75 years since Thor Heyerdahl and five of his fellow adventurers reached Raroia in the Tuamotu Archipelago of French Polynesia, having set off 101 days earlier from Callao, Peru, in the balsa raft *Kon-Tiki*—Explorers Club Flag N°123 flying from her rigging. Heyerdahl had embarked on that harrowing, 6,900-kilometer journey to prove a point—that the early peoples of South America, Peru in particular, were capable of reaching Polynesia in the watercraft of their time. So, could they? The answer, from a technological perspective, is quite possibly. Did they? The answer, from an archaeological and genetic point of view, has been a resounding no.

ANGELA M.H. SCHUSTER TAKES IN THE ORGANIC EARTHINESS OF THE FRANCIACORTA WINE REGION OF ITALY.

While Heyerdahl's theory of the colonization of Polynesia has proven to be false and earned him a host of detractors over the years, what that visionary Norwegian accomplished forever shaped the fields of archaeology and anthropology, forcing scholars to field-test their hypotheses before ruling anything out.

This edition, we have teamed up with the Kon-Tiki Museum and Atelier Éditions to celebrate Heyerdahl's unbridled spirit of adventure in a pair of essays—one penned by our honorary director Sylvia A. Earle, the other by Rapanui archaeologist Sonia Haoa Cardinali.

I had the pleasure of knowing Thor and fondly remember the dinners we had when he came to New York with his wife Jacqueline—my husband Carl and I having struck up a friendship with them in The Explorers Club bar. At that time, I was an editor at *Archaeology* and Thor made it known that he did not appreciate our magazine's coverage of his research. Yet, ever so often, a fax would come across the transom from Thor in Tenerife. Its message was invariably brief and to the point: "We will be in town… awaiting dinner details." Our job was to ring up his crew mates—John Loret and Norm Baker—and other close friends and arrange a party to be enjoyed by all. And for that privilege I will be forever grateful. Skál!



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EXPLORATION NEWS

EDITED BY JEFF BLUMENFELD

A ROAD WARRIOR INDEED

ROUTE OF THE LEGENDARY ALL-BLACK BICYCLE CORPS RETRACED

Cycling some 3,060 kilometers over 41 days, Erick Cedeño, an adventurer from Santa Monica, California, and EC50 honoree, has retraced the route taken by the 25th Infantry "Buffalo Soldier" Bicycle Corps from Missoula, Montana, to St. Louis, Missouri, in 1897.

Called "The Great Experiment" in national newspapers, the original journey also took 41 days to complete and was undertaken at the direction of the United States Army to determine the effectiveness of moving troops by bicycle. The route closely followed the Northern Pacific and Burlington railroads through Montana, Wyoming, South Dakota, Nebraska, and Missouri, and was chosen to challenge the riders with as many different climate and field conditions as possible.

Upon completion of his retrace, Cedeño, 48, said, "This had been a dream of mine for years, and to finish in St. Louis on the 125th anniversary of the original trip moved me to tears." The mayor of St. Louis declared that July 24 will now be known as "Iron Riders Day," in recognition of Cedeño's arrival at the Missouri History Museum on that date to the applause of well-wishers.

ERICK CEDEÑO ON THE ROAD DURING HIS RETRACE OF THE BUFFALO SOLDIERS' EPIC 1897 RIDE. IMAGE COURTESY ERICK CEDEÑO.

STEPPING INTO THE POLAR LIMELIGHT

Five years after having led an all-female multinational, expedition to the North Pole, British explorer Felicity Aston's barrier-breaking adventure is once again in the spotlight, this time featured in *Exposure*, a new flick by Brooklyn-based filmmaker Holly Morris, which is making the film festival rounds.

For her Women's Euro-Arabian North Pole Expedition, Aston brought together 11 women from the Arab World and the West—among them a Muslim chaplain, a French biologist, and a Qatari princess—to ski across the melting Arctic sea ice to the North Pole to heighten awareness of the fragility of our polar regions.

In the film, Morris and her crew brilliantly capture the struggle of the adventurers, who navigate everything from frostbite and polar bear threats to sexism and self-doubt in an intimate story of resilience, survival, and global citizenry as they work through profound differences in language, religion, communication, and culture to achieve a singular, common goal. In the end, four team members became the first from their nations to ski to the North Pole. As Rick Kogan of the *Chicago Tribune* put it: "No dogs. No snowmobiles. No support. No men. It is a triumph for all involved, a delight and joy for viewers, a chilling revelation."

The film, which is slated to be screened at The Explorers Club this coming September, is accompanied by a book, *Polar Exposure*, penned by Aston and published this past fall. For more, visit: exposure-film.com.

ADVOCATING FOR THE ROSS SEA

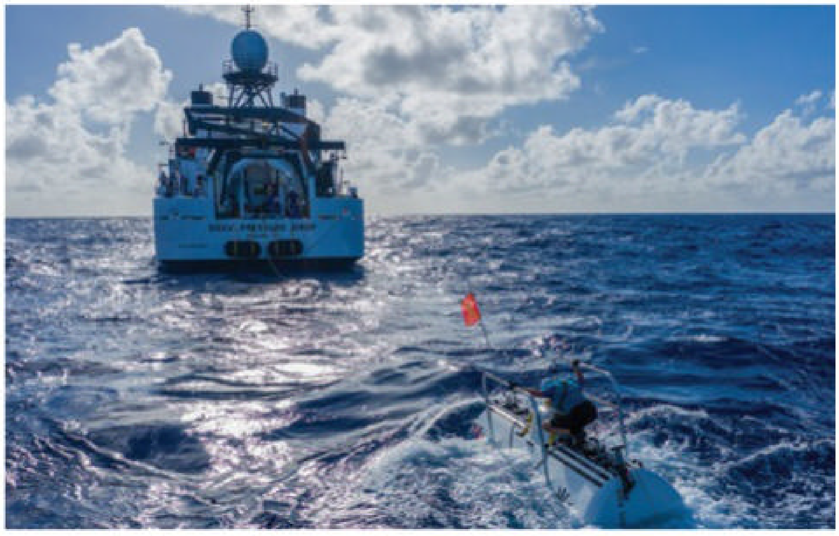
When The Explorers Club 50 program was launched in 2020, the organization was looking to recognize "50 people changing the world whom the world needs to know about." One of those, Cassandra Brooks, an assistant professor of environmental studies at the University of Colorado Boulder, is a passionate friend of the Ross Sea Antarctic toothfish, a creature with a face only a mother toothfish could love.

The toothfish, says Brooks, can live up to 50 years. And, like many deep-dwelling, long-lived fish, it is vulnerable to over-exploitation in addition to climate change. Despite its looks, the fish is sought after by chefs for its white, moist, flaky flesh, which is highly versatile and rich in Omega-3 fatty acids. Most consumers will know it as Chilean sea bass.

"The Antarctic has emerged as a resource frontier, with international fishing operations increasingly encroaching south. We have very little time to act before changes in Antarctica become irreversible," she says.

Brooks, who has been on five expeditions to Antarctica, is a core member of The Last Ocean—a grand-scale media project that has included the production of a 2012 film of the same name—which is focused on protecting the Ross Sea and empowering the next generation of environmental leaders. Cofounded by her husband, Boulder nature photographer and writer John Weller, in 2004, The Last Ocean believes the only way to fully protect the Ross Sea ecosystem is to stop commercial fishing and have the entire Ross Sea, including the continental shelf and slope, designated as an Marine Protected Area (MPA). For more information, visit: lastocean.org.

MEMBERS OF THE WOMEN'S EURO-ARABIAN NORTH POLE EXPEDITION ON THE ICE WITH FLAGS OF THEIR RESPECTIVE NATIONS.
IMAGE COURTESY FELICITY ASTON.



A SEA CHANGE OF HANDS

Retired U.S. Navy veteran and private equity wiz Victor Vescovo has sold his ultra-deep diving submersible DSV *Limiting Factor* and its mother ship DSSV *Pressure Drop*—collectively known as the Hadal Exploration System (HES)—to Inkfish, a global nonprofit dedicated to ocean exploration and research funded by American billionaire Gabe Newell.

Over the past five years, Vescovo, who made history in April 2019 with his multiple dives to Challenger Deep in the Mariana Trench, has undertaken numerous expeditions using the Triton Submarines-designed HES, including the Five Deeps Expedition of 2018–2019, which saw the first human descent to the deepest points in all five of the world's oceans, and the Ring of Fire Expedition, during which Vescovo probed a tectonically volatile region of the Pacific. More recently, he discovered the wreck of the USS *Samuel B. Roberts* in the Philippines, which, at 6,895 meters, is the deepest-known in the world. In 2020, Vescovo was awarded The Explorers Club Medal in recognition of his efforts. He has shared the system and his deepest thoughts with a dozen members of The Explorers Club, among them astronaut Kathryn D. Sullivan and adventurer Kelly Drennan Walsh, son of Don Walsh, who, with Swiss engineer Jacques Piccard, was the first to Challenger Deep in 1960 (see page 88).

Inkfish plans to continue surveying the deepest, unexplored areas of our planet's oceans, on a multiyear scientific mission led by Alan Jamieson of the University of Western Australia. Jamieson previously served as chief scientist on many of Vescovo's expeditions, including Five Deeps and the Ring of Fire.

"After managing and personally diving the system for more than four years, I'll be looking forward to taking a bit of a break and refocusing on my private equity and venture capital investments, which allowed me to personally fund this entire set of expeditions in the first place," Vescovo told the media upon announcing the deal—the terms of which have yet to be disclosed.

GET SNAPPING

Two upcoming solar eclipses are bringing out entrepreneurs. University of Colorado Boulder professor Douglas Duncan, a former Hubble Space Telescope astronomer, has developed Solar Snaps in time for the big annular solar eclipse on October 14, visible in the Western United States, and the April 8, 2024, total solar eclipse that will cross Mexico, the Central and Eastern U.S., and portions of Canada, offering more than four minutes of totality in places.

"At several recent eclipses, I noticed people taking photos of the sun with their phones. But sunlight is strong enough to damage a phone camera just as it can damage your eyes if not protected," Duncan says. His solution? Solar Snap: a set of filters for mobile phones and eclipse glasses. Learn more at: eclipseglasses.com.

DSV *LIMITING FACTOR* AND ITS SUPPORT SHIP, DSSV *PRESSURE DROP*, OVER THE MARIANA TRENCH. PHOTOGRAPH BY TAMARA STUBBS.

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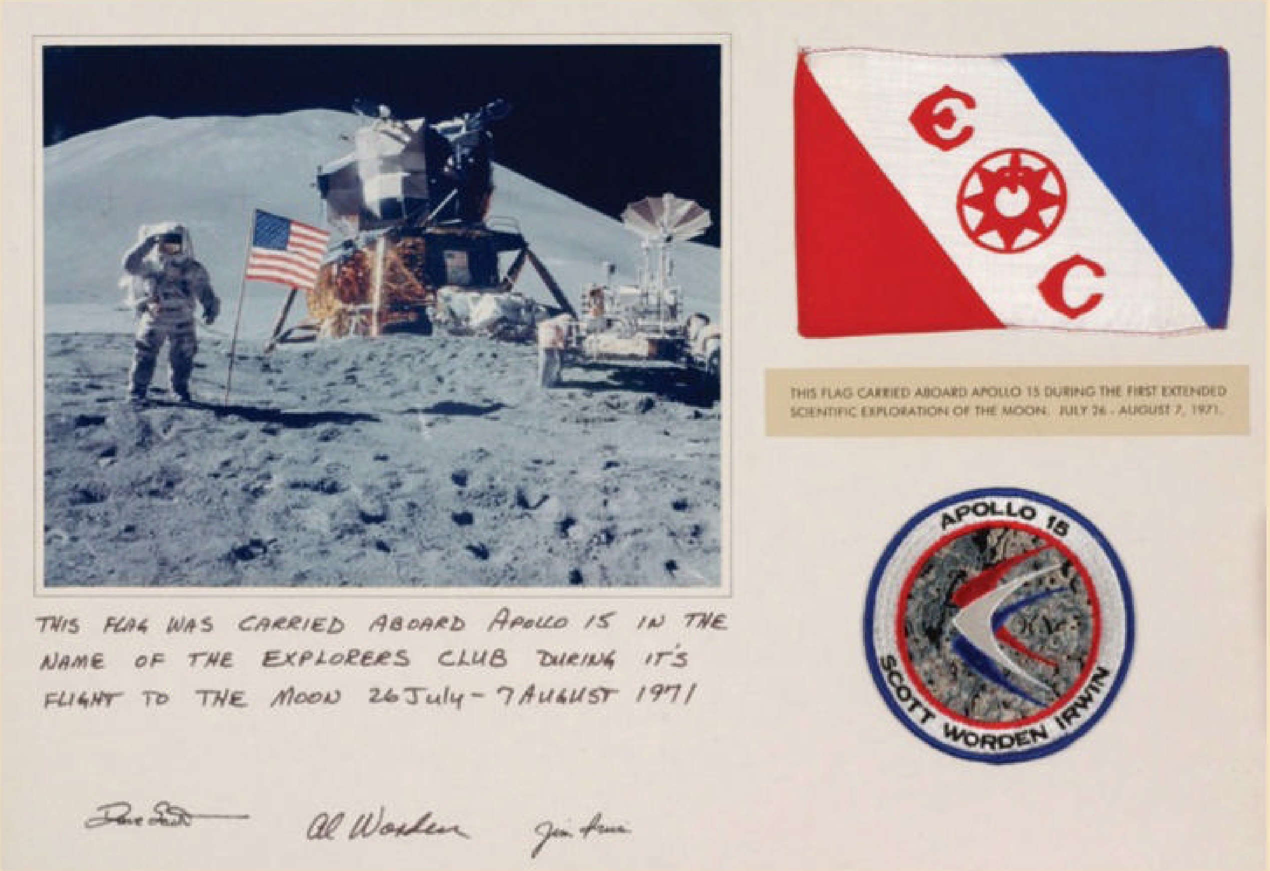

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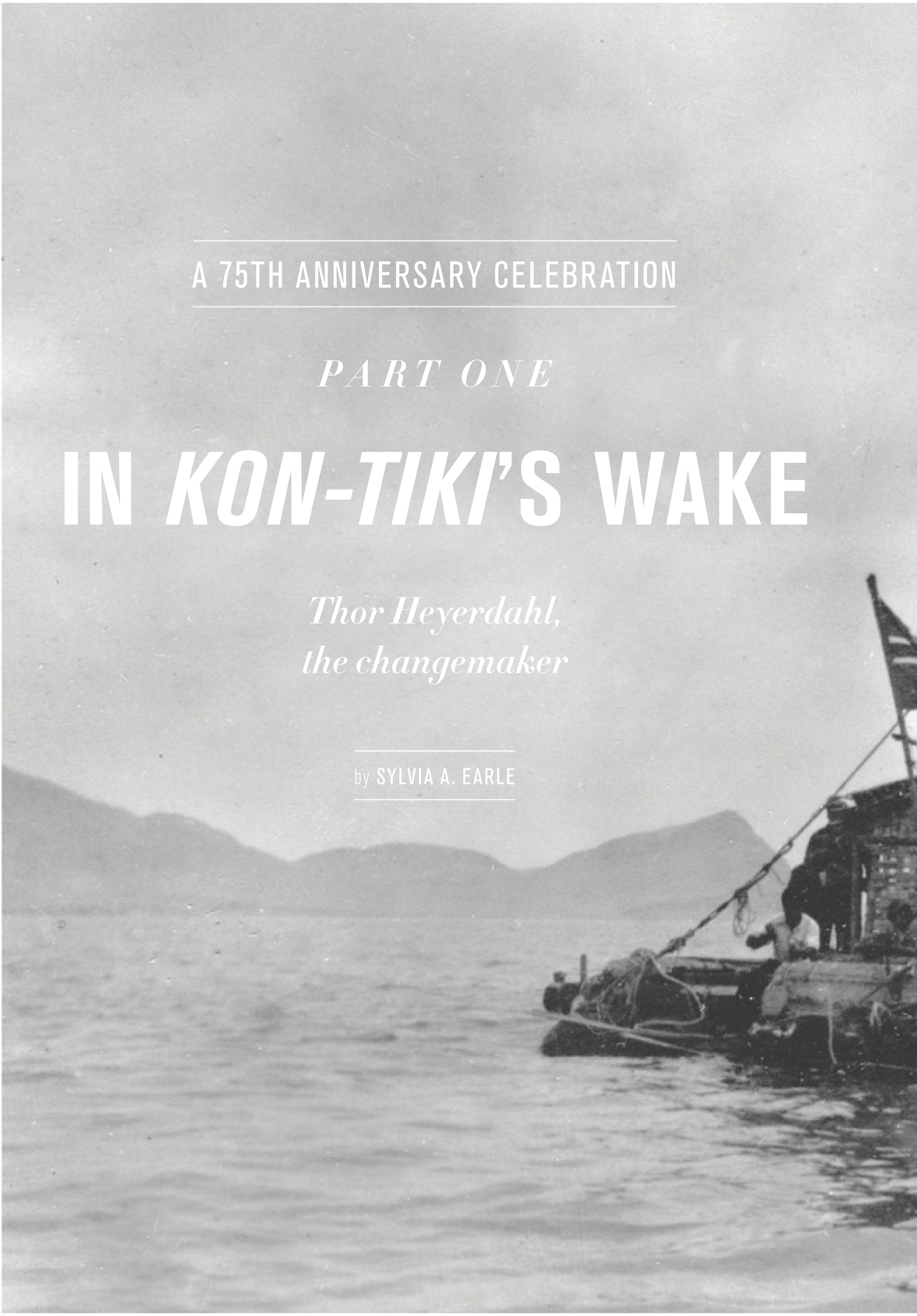


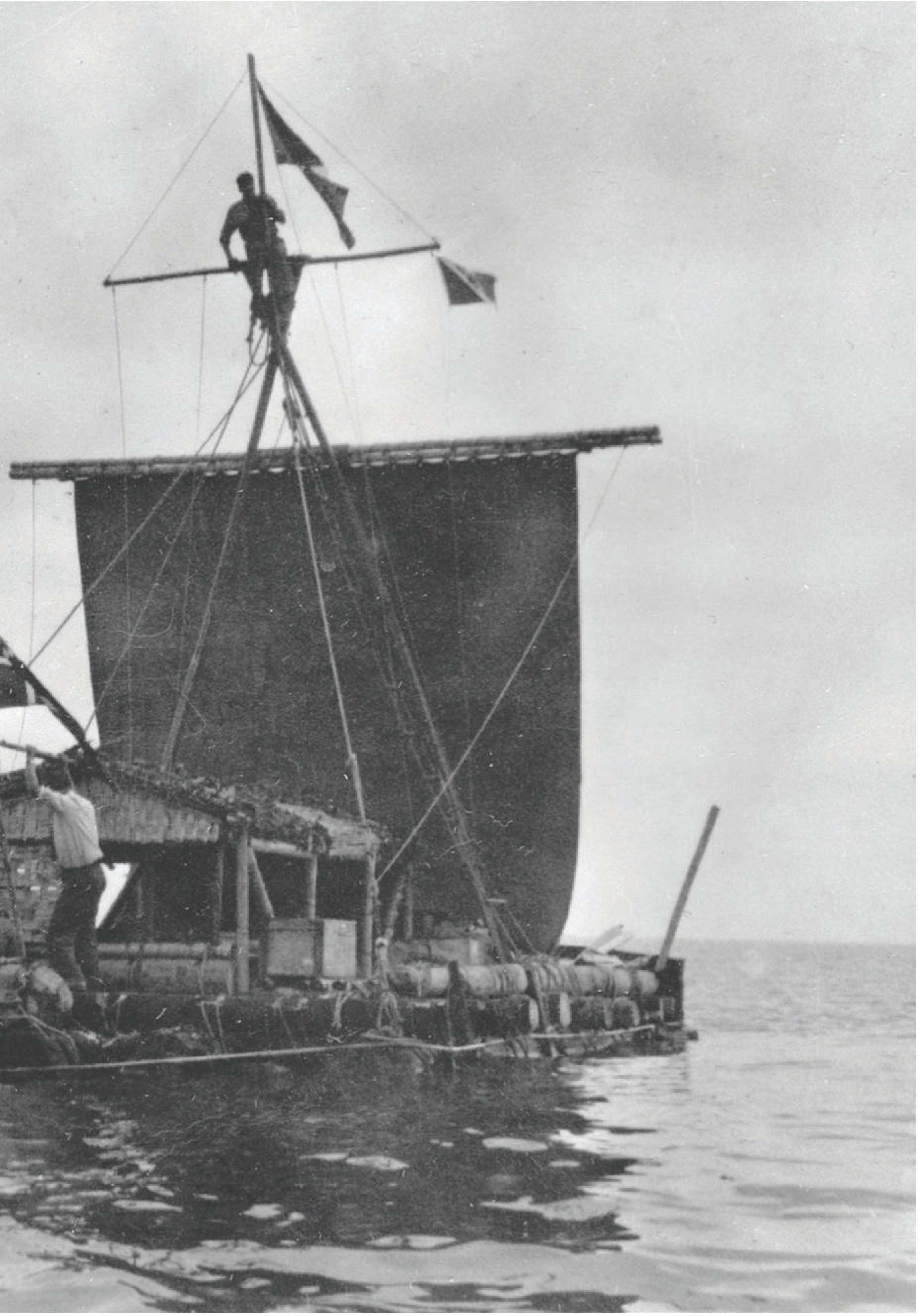
A 75TH ANNIVERSARY CELEBRATION

PART ONE

IN *KON-TIKI*'S WAKE

Thor Heyerdahl, the changemaker

by **SYLVIA A. EARLE**



AN HONORARY DIRECTOR OF THE EXPLORERS CLUB AND A RECIPIENT OF IT HIGHEST HONOR, THE EXPLORERS CLUB MEDAL, SYLVIA A. EARLE IS AN EXPLORER-IN-RESIDENCE AT THE NATIONAL GEOGRAPHIC SOCIETY; THE FOUNDER OF MISSION BLUE AND DEEP OCEAN EXPLORATION AND RESEARCH; AND SERVED AS FORMER CHIEF SCIENTIST AT NOAA. SHE IS A CONTRIBUTOR TO *THOR HEYERDAHL: VOYAGES OF THE SUN*—A HANDSOME, LIMITED-EDITION SEVENTY-FIFTH ANNIVERSARY COMMEMORATIVE VOLUME, PUBLISHED BY ATELIER ÉDITIONS AND THE KON-TIKI MUSEUM—FROM WHICH THIS ESSAY HAS BEEN ADAPTED.

> *"Borders? I have never seen one. But I have heard they exist in the minds of some people."*
> *– Thor Heyerdahl*

During his lifetime, Thor Heyerdahl significantly contributed to answering the questions that have inspired humanity for as long as we have existed: Who are we? Where did we come from? And where might we be going? While his lifelong passion was unraveling puzzles about human connections, Heyerdahl was also mindful that humans are a part of nature. More than most of his scientific colleagues, he recognized and cared about how the environment determines human success and failure and questioned "common knowledge" with uncommon willingness to prove or disprove dogmatic concepts, putting himself at the cutting edge of learning.

Heyerdahl helped document the greatest era of change in the history of civilization, his life spanning the latter part of the Holocene epoch and the start of a new epoch, the Anthropocene, marked by the impact of human industrialization, destruction of wilderness, and fallout from nuclear detonations. Until then, it seemed that nothing that humans could do could alter the habitability of Earth. Air, water, land, and wildlife were treated as limitless "natural resources" to be used or consumed to foster human prosperity. During the early part of the Holocene, only a few thousand humans existed. As a young man, Heyerdahl was one of about two billion. That number doubled by 1980 and it has since doubled again, putting unprecedented pressure on the natural systems that underpin our existence. About 90 percent of the fish consumed by humans are at a fraction of their former abundance and coral reefs, mangroves, seagrass meadows, and kelp forests have been reduced by about half. Heyerdahl wrote about the pristine nature of the sea while aboard the *Kon-Tiki* in 1947, and how in a few decades, aboard *Ra II*, he witnessed tar balls, oil slicks, and an avalanche of refuse sweeping the ocean.

When I first met Heyerdahl in the 1970s, he was curious about my findings as a scientist and "aquanaut" and how my observations under the sea compared with his made from its the surface. We shared the wonder of the recent first images from the Moon, which made it clear that Earth is mostly blue and that boundaries imposed by humans tend to disappear when viewed from high above or beneath the waves. Heyerdahl demonstrated that the sea has not only been a formidable barrier over the ages but also a well-traveled network of aquatic highways, connecting people over vast distances. He simultaneously gathered vital insights about other high-seas voyagers, from sharks, whales, turtles, dolphins, squid, and birds to legions of planktonic creatures.

OPENING SPREAD: EXPLORERS CLUB FLAG Nº123 FLIES FROM *KON-TIKI*'S UPPER YARD. FACING PAGE: THE CREW OF THE *TIGRIS* (FROM TOP)—ASBJØRN DAMHUS AND NORRIS BROCK; RASHAD SALIM AND GERMÁN CARRASCO; HANS PETER BØHN, TORU SUZUKI, AND DETLEF SOITZEK; NORMAN BAKER, THOR HEYERDAHL, YURI SENKEVICH, AND CARLO MAURI. ALL IMAGES THIS STORY COURTESY THE KON-TIKI MUSEUM, OSLO.

We met many more times over the years. In the 1980s, I joined Heyerdahl and Sir Peter Scott on a mission to win support for a moratorium on the commercial killing of whales. And in the 1990s, I was with Heyerdahl at Japan's Osaka Aquarium Kaiyukan where I had my first glimpse of a whale shark. Heyerdahl described an encounter with one twice her size during the *Kon-Tiki* expedition. At the time, little was known about their gentle nature and the black-and-white images of the encounter were among the first to be recorded.

The last time we spoke was at an Explorers Club event celebrating the accomplishments of twentieth-century scientists and explorers. Among them, a certain tall, thoughtful Norwegian loomed large for his decades of heroic efforts to understand the past as a vital prelude to an enduring future for all of life on Earth. Thor Heyerdahl's most important legacy may be as a champion for nature, inspiring others to see the significance of the living ocean to everything we care about: health, prosperity, security, and, most of all, the existence of life itself. We know our oceans are in trouble, and so are we. Yet Heyerdahl remained optimistic that the twenty-first century could be the turning point from decline to recovery as the dire consequences of conflict and complacency come into focus. Before his death, he composed a message to his children and to all the children to come, asking for forgiveness for what we, their predecessors, have done to diminish their chance for success. He sought their help to "heal the system we have wounded. All that walk and crawl and swim and fly are members of our extended family."

PREVIOUS SPREAD: GEORGES SOURIAL, NORMAN BAKER, AND CARLO MAURI REPAIR ONE OF THE GIANT STEERING OARS ON *RA II*. FACING PAGE: THOR HEYERDAHL BURNS THE *TIGRIS* OUTSIDE DJIBOUTI HARBOR IN AN ACT OF PROTEST AGAINST THE SALE OF ARMS FROM THE SUPERPOWERS OF THE WORLD TO SMALL COUNTRIES IN AFRICA.

A 75TH ANNIVERSARY CELEBRATION

PART TWO

IN *KON-TIKI*'S WAKE

Thor Heyerdahl's Polynesian legacy

by SONIA HAOA CARDINALI

448

SONIA HAOA CARDINALI IS A RAPANUI ARCHAEOLOGIST WITH THE MATA KI TE RANGI FOUNDATION AND IS COORDINATOR OF THE ISLAND'S NATIONAL MONUMENTS. SHE HAS BEEN AWARDED AN HONORARY PHD FROM UPPSALA UNIVERSITY. SHE IS A CONTRIBUTOR TO *THOR HEYERDAHL: VOYAGES OF THE SUN*—A HANDSOME, LIMITED-EDITION SEVENTY-FIFTH ANNIVERSARY COMMEMORATIVE VOLUME, PUBLISHED BY ATELIER ÉDITIONS AND THE KON-TIKI MUSEUM—FROM WHICH THIS ESSAY HAS BEEN ADAPTED.

On April 28, 1947, the Norwegian explorer Thor Heyerdahl set sail, along with a crew of five intrepid sailors, from the port of Callao in Peru in the direction of Polynesia. They made the journey on a raft of balsa logs constructed using the authentic ancestral materials and techniques of the indigenous people of Lake Titicaca. It took them 101 days to travel nearly 7,000 kilometers to the atoll of Raroia, part of the Tuamotu Archipelago in the middle of the Pacific Ocean. The expedition aimed to prove the theory that people from South America had populated the islands in Precolumbian times, as recounted in the oral traditions of Peru.

It is now 75 years since Heyerdahl crossed the Pacific in the *Kon-Tiki* raft, propelled by his firm belief in the theory that the islands had been populated from the coast of South America. As I look back on that expedition and reexamine that belief—questioned by many at the time—I find with the benefit of hindsight that this much-debated issue, whatever its academic veracity, forged diverse, intricate paths that would open the way for the scientific examination of everything he put forward as an object of study.

To my mind, Heyerdahl was the most experienced, daring, courageous, and thoughtful explorer the modern world has known. His intellectual curiosity knew no limits. For his scholarly interest in all matters archaeological, anthropological, sociological, linguistic, geographical, biological, botanical, and cultural, among others; for his sharp intuition; for his passion for unveiling ancient mysteries; and for the tremendous humility he showed in his encounters with every land and its people, I believe that his contribution to contemporary science is unparalleled. Heyerdahl had an enthusiastic interest in all sciences, and, if we are to tackle contemporary issues, such as climate change and pollution, his inclusive way of looking at the world is a lesson to us today.

Each one of his journeys contributed to the further identification of the islands and other enclaves around the Tuamotu Archipelago, with all that it entailed. In doing so, with his broad vision, he has managed to highlight the heterotopia within each of these spaces. As an Indigenous person of what was possibly his most studied island, I have no qualms in acknowledging that it was he who put Rapa Nui—or Easter Island as it is often known—on the world map.

Once established as the focus of growing interest to researchers the world over, Rapa Nui, which at the time relied on only subsistence agriculture and precarious artisanal fishing, began to benefit from a whole movement of pioneering travelers. This gave rise to the first attempts at tourism, which helped to sustain a minimal local economy and spurred the development of the inhabitants' own tourist initiatives, assisting the visitors in their countless forays to wonder at, observe, discover, study, and learn about the island and, in particular, its distinctive statues—the moai and the *ahu*s, or platforms, upon which they were erected.

OPENING SPREAD: THE *KON-TIKI* RAFT AT SEA. FACING PAGE: HEYERDAHL BESIDE A MONUMENTAL MOAI AT RANO RARAKU ON RAPA NUI (EASTER ISLAND).

Confronted with what was clearly our dire need, Heyerdahl showed no hesitation in buying old, handcrafted pieces to take back with him as artifacts. Many of these had been recently manufactured and forcibly aged so that they could be sold or exchanged for the utensils, tools, clothing, or food the explorer brought with him. Aware of the harsh reality of island life, moved by the local population's inability to access goods, and extremely supportive of them, he would accept every single piece he was offered with a knowing nod, aware that they were not all genuine antiquities.

His contribution to Rapa Nui's heritage is probably most significant in material terms and most important from a historical perspective. It was always his most fervent wish that the pieces he bought from the Indigenous people would be returned to the island at some point, never intending to appropriate the objects but instead to research them more completely.

Nor was he possessive or selfish when it came to his findings. Instead, he drew many other scientists to the island through the years, laying the foundations for the historical reinterpretation of events that had taken place over the centuries concerning the extremely developed people that first inhabited the island, one that could almost be considered a civilization in its own right.

The Rapanui might have been recognized as such, had the island's extreme isolation not prevented the territorial conquest of other peoples, who could have assimilated their culture. Nevertheless, they possessed technology, their own language, writing, architecture, engineering, and other markers of development and social organization that are evidence of a multifaceted cohesion, in particular, with regard to the statues that have survived close to 1,000 years.

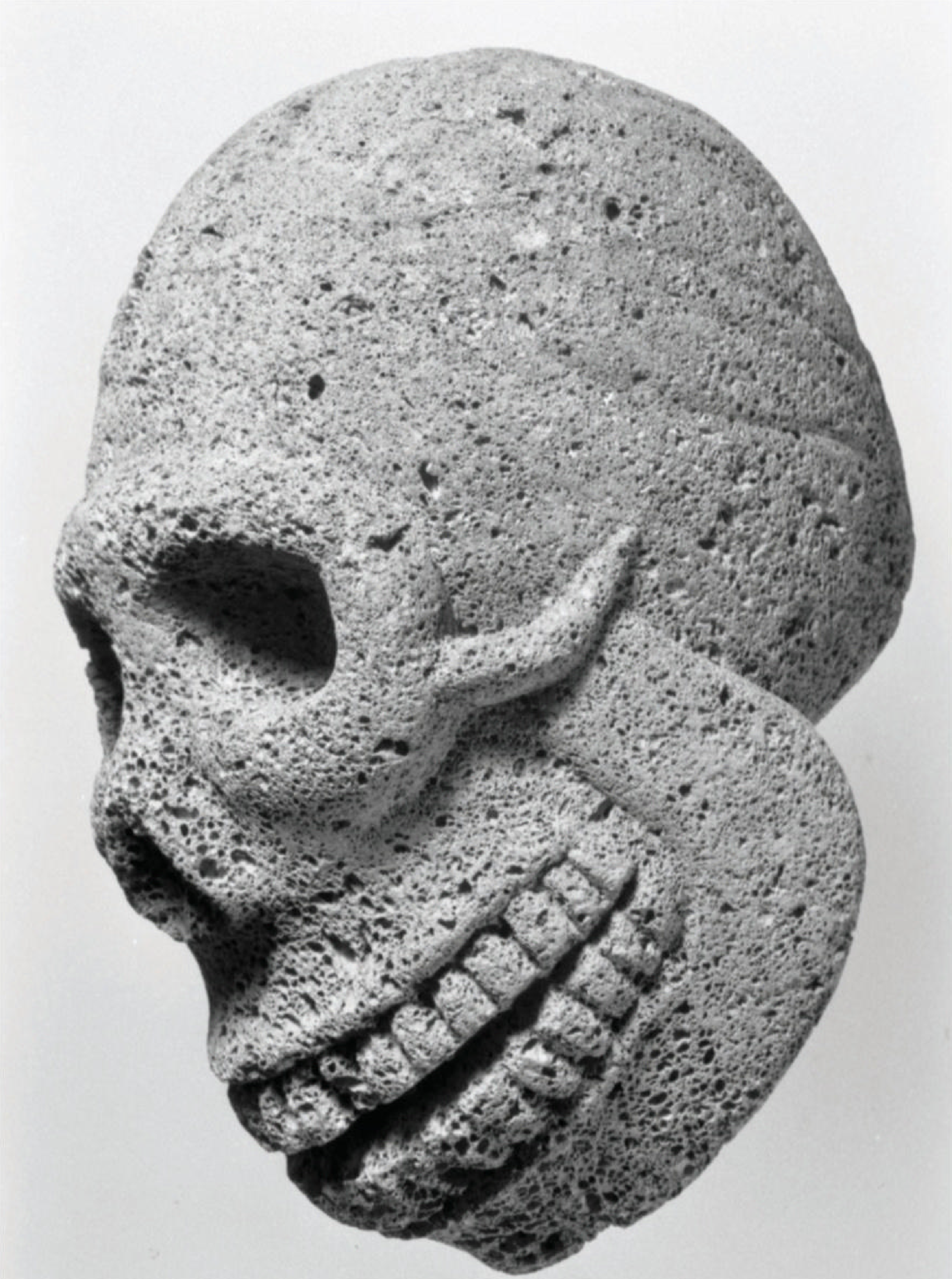
To me, Heyerdahl represents the most important scientific point of reference in relation to Pacific cultures, given that his theory, accurate or not, continues to attract academic interest and research, whether to refute or defend it. Any discussion of Polynesian migration must explore his theories, because it is impossible to ignore his contribution. He made people engage with this subject—whether that be to prove or disprove his assertions.

A couple of decades after his first visit to Rapa Nui, the Canadian scientific expedition METEI (Medical Expedition to Easter Island) carried out medical examinations among the population, giving rise to many other initiatives of genetic interest. For the most part, these initiatives attempted—through the study of vegetal and other species—to trace the migratory route of the Rapanui ancestors from Southeast Asia eastward, across Oceania some 3,000 years ago, before settling on Rapa Nui some 2,000 years later.

As ancient navigators who seem to easily interpret the movement of tides, currents, birds, the Moon, and the stars, the Polynesian people have a deep-rooted connection to the natural world. For this reason, I am personally inclined to assert that we originated from the West and not from South America.

It is well known that on large continental landmasses, navigation usually ran in parallel to the coast, from where the terrestrial landscape could be inspected and contact could be made with other peoples, creating commercial links and leading to the exchange of goods and materials of mutual interest, or simply to the conquest of new lands. Although straying away from safe, visible coastal lands on uncertain, dangerous routes would have been less common, we cannot entirely rule out the possibility of contact between these groups.

PREVIOUS SPREAD: NORMAN BAKER MEASURES THE HEIGHT OF THE SUN FOR NAVIGATION. FACING PAGE: A CARVED STONE SCULPTURE COLLECTED BY THE EXPEDITION ON RAPA NUI.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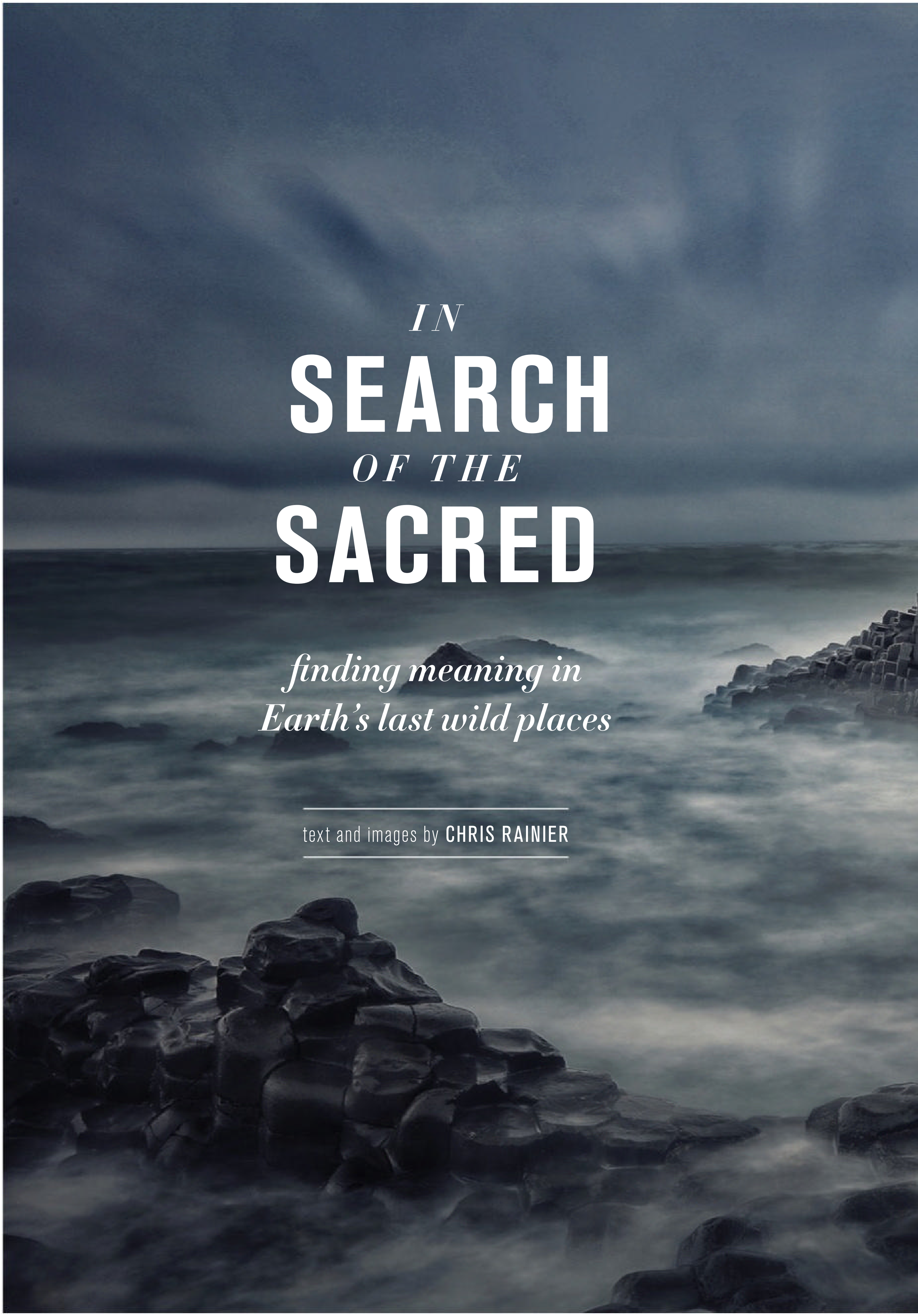
Nevertheless, I should make clear that the conclusions I draw now—with all the technological tools at my disposal today enabling me to do so—could not have been reached in the middle of the last century, when those tools were not available. Thor Heyerdahl's daring theories and expeditions set the stage for all subsequent inquiry, resulting in an unparalleled legacy and references to him in every book on this subject.

He was a man with a broad vision and transparent intentions. From him, I learned how to look beyond the obvious, keep an open mind, and be a scientist that leaves space for other possibilities rather than maintaining narrow or inflexible points of view. Cherishing freedom of thought as he did, he never imposed a particular way of looking at things on me, and instead celebrated our differences. Nor did I ever feel any pressure other than to think and analyze things for myself and come to my own conclusions. His aim was one of understanding and not ownership, implying the rejection of many privileges and comforts in favor of advancing scientific progress. He believed that the sea belonged to everyone, and that by gathering diverse teams of people with differing viewpoints, we could tackle questions more broadly and more effectively.

THOR HEYERDAHL CLIMBS A COCONUT TREE.



IN SEARCH *OF THE* SACRED

finding meaning in Earth's last wild places

text and images by **CHRIS RAINIER**

CHRIS RAINIER, A NATIONAL GEOGRAPHIC SOCIETY EXPLORER AND DOCUMENTARY PHOTOGRAPHER/FILMMAKER WHO HAS FOCUSED ON ENDANGERED CULTURES AND TRADITIONAL LANGUAGES AROUND THE GLOBE, WAS A 2002 RECIPIENT OF THE EXPLORERS CLUB'S LOWELL THOMAS AWARD. HE IS THE DIRECTOR OF THE CULTURAL SANCTUARIES FOUNDATION. HE IS ALSO THE COFOUNDER AND CODIRECTOR OF THE NATIONAL GEOGRAPHIC SOCIETY'S ENDURING VOICES LANGUAGE PROJECT AND DIRECTOR OF ITS ALL-ROADS PHOTOGRAPHY PROGRAM, DESIGNED TO SUPPORT INDIGENOUS GROUPS WITH MODERN TECHNOLOGY, ENABLING THEM TO DOCUMENT THEIR TRADITIONAL CULTURE.

Enveloped by darkness, it took me a while to see the light within the void. At first, it was a faint blue line searing the desert night sky. Then it spread across the horizon. Slowly, as the first colors of sunrise cut the sky, another Saharan day had begun.

I was some 800 kilometers deep in the baking sand dunes of northern Mali on a camel expedition in search of the sacred. We had left Timbuktu weeks ago, heading north, navigating by an ancient system of the Tuareg, the blue men of the desert. Each day, after his morning prayers, my guide Mohammed, a devout Muslim, would sit quietly on a high sand dune, tracking the lingering morning star, then he would intensely observe the shadows across the land and the direction of the wind patterns across the desert to the horizon. All these subtle signs allowed him to track us precisely across this sea of sand. Without the aid of a compass, Mohammed was taking us to a point beyond the horizon—a place he held sacred.

When we arrived, it was not anything I had expected—not an ancient temple lost among the dunes or a yet-to-be discovered city rivaling Timbuktu. It was a shimmering oasis where Mohammed found succor, after nearly perishing from thirst many years before.

Mohammed told me that one day, when still a young man learning the celestial navigation, he had got lost with his camels. At some point, and for reasons which he did not share, he became separated from his beasts of burden. He staggered on. Eventually, nearing certain death, he sank to his knees in the sand and prayed to Allah. In a simple and powerful moment of light and awareness, Mohammed's God directed him along an unknown path to a watering hole—the very one upon which we were now gazing. It was beautiful in its simplicity—an oasis teeming with life surrounded by nothing but sand for a thousand kilometers in all directions. For Mohammed, this font of life was so much more than water. It was an affirmation of spirit, of divinity. It was the very essence of sacredness.

As I have come to realize during my own journey in this world, sacredness comes in all forms and can be found in all belief systems and in all places. Its definition morphs with time, with age, and with wisdom—and can be seen in different ways for each of us. A lake of water is to one the very meaning of light and of God. To another, it is simply a welcome watering hole to quench one's thirst along a journey. A mountain for one can be a place of pilgrimage. For another, it represents a challenging summit upon which to top out, all the while contemplating one's own mortality.

I have always been fascinated with the concept of power places and energy points. In my journeys, I have sought them

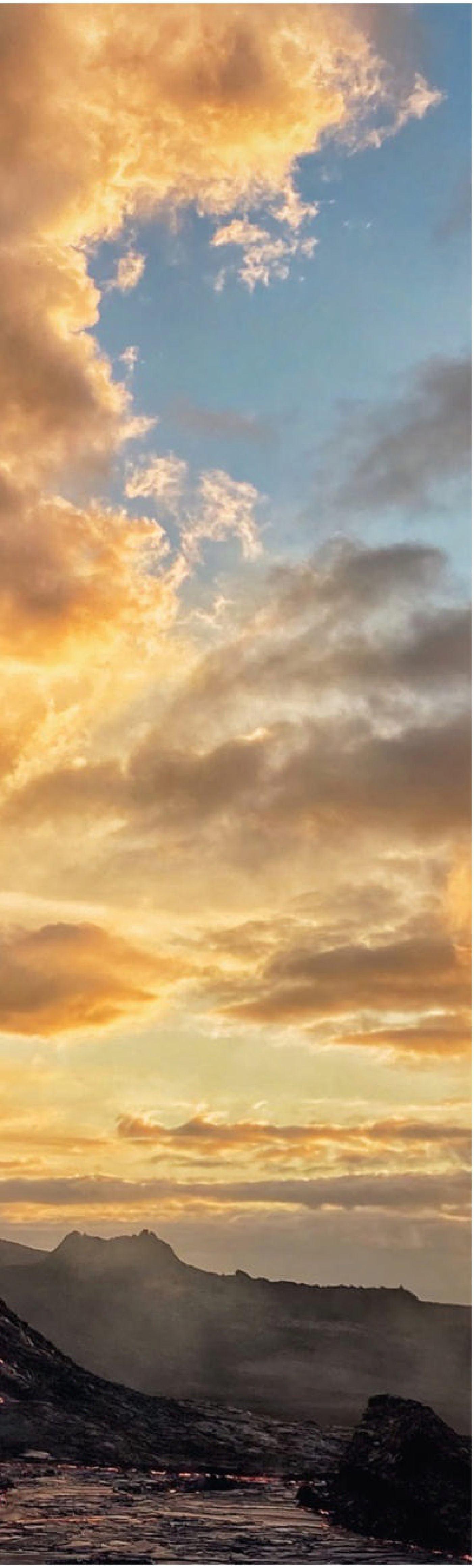
OPENING SPREAD: STORM CLOUDS AND TURBULENT SEAS ENGULF THE "GIANT'S CAUSEWAY" IN NORTHERN IRELAND. FACING PAGE: NUNS EMERGE FROM A TEMPLE IN THE HOLY CITY OF VARANASI, INDIA.

out—power places such as Machu Picchu high in the Andes; Rapa Nui (Easter Island), where moai hewn from volcanic rock stand as silent sentries on one of the most isolated islands in the Pacific; or the Taj Mahal, shimmering as silver in the moonlight on the floodplains of northern India. I have been lucky enough to have visited many of the world's sacred buildings over the past four decades, rising before the crack of dawn to watch the first golden light of the day wash over their splendor and pausing after sunset to gaze at their ancient temples bathed in the mystical gray silver light of a full moon. Every time, I ask myself: What makes power places such as these sacred?

Today, I continue to explore and travel the planet documenting our last remaining wilderness places and sacred sites, so vulnerable before the tsunami of modernity and other forces that are powerfully changing the world that we live in.

Most recently, my peregrinations have taken me to Iceland, where I took refuge from the societal storm and isolation wrought by covid. It is a place so raw that, if one is not careful, its brutal beauty can almost bring one to one's knees. I explored its rugged landscape during the winter and into the spring and, on one dark, frigid night, I was lucky enough to witness the beauty of the northern lights dancing across the night sky. With its nocturnal auroral ballets, its raging waterfalls, and its black lava beaches where stranded icebergs shine like diamonds in the surf, Iceland demands that you pay attention to it. It feels like a land just born—a primordial pulse within its soul, beating powerfully in celebration of life.

PREVIOUS SPREAD: A YOUNG MONK WITH THE 27-METER-LONG RECLINING BUDDHA INSIDE MANUHA TEMPLE, BUILT IN 1067 CE AT BAGAN, MYANMAR. FACING PAGE: WHALE BONES STAND SENTINEL AT AN ANCIENT YUPIK SACRED SITE ON THE SIBERIAN COAST OF FAR EASTERN RUSSIA.



I hiked to ice caves on the edges of immense glaciers that span much of the country. These glowing turquoise caverns can sometimes reach several hundred meters into the glacial interior with ceilings soaring up 15 meters or more. Otherworldly as they cast their aquamarine light upon all in sight, the caves crackle as the energy of the glacier torques their very structures. It's as if the caves are alive and breathing, as water pulses behind their translucent walls, forced by gravity to find its inevitable flow toward the sea.

I felt humbled by all the elements of this land: water, sky, earth, and fire. Having witnessed the birth of Iceland's newest volcano, Fagradalsfjall, in the spring of 2021, I hiked several kilometers up to its crater rim to take in its awesome power and to feel its heat on my skin. For hours, I sat mesmerized by its raw, primordial beauty as I listened to the sound of the magma flowing toward me. An eerie invocation not unlike glass slowly being tinkled in the distance; it was the sound of the very DNA of the Earth forming billions of years ago. As I beheld this fiery beginning of all life, I understood, for the first time in my life, that being alive and in the moment is the most sacred act of all.

PREVIOUS SPREAD: FAR FROM THE TOURIST CROWDS AT ANGKOR WAT LIES A FORGOTTEN KHMER TEMPLE LOST TO THE JUNGLE IN CAMBODIA. FACING PAGE: LAVA FLOWS FROM ICELAND'S NEWEST VOLCANO, FAGRADALSFJALL, WHICH ERUPTED ON THE SCENE IN MARCH OF 2021.

OWLS
OF THE
ARCTIC CIRCLE

documenting one man's quest
to preserve a fragile ecosystem

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text and images by **JAMES MAXWELL LOWE**

A FELLOW OF THE EXPLORERS CLUB SINCE 2019, JAMES MAXWELL LOWE IS KNOWN FOR HIS ABILITY TO CAPTURE STORIES IN THE MOST REMOTE CORNERS OF THE WORLD, HAVING HONED HIS SKILL AS A DIRECTOR AND PHOTOGRAPHER IN HIS SEARCH FOR ADVENTURE AND NARRATIVES UNHEARD. FROM HIS HOME IN THE MOUNTAINS OF MONTANA TO NOW COUNTLESS COUNTRIES, LANDSCAPES, AND CULTURES ACROSS THE GLOBE, MAX HAS BEEN A WITNESS TO STORIES SPANNING THE GAP OF HUMAN EXPERIENCE. HIS OWLS OF THE ARCTIC DOCUMENTARY PROJECT IS SUPPORTED BY THE EXPLORERS CLUB THROUGH ITS DISCOVERY EXPEDITION GRANT PROGRAM.

Even though the summer sun is high in the sky and the landscape around us is vibrant green with the 24-hour light afforded here beyond the Arctic Circle in mid-July, the wind cuts deep as it blows in off the Chukchi Sea, which is still covered in thick sea ice on the distant horizon. The old, ruffed hood of Denver Holt's Army surplus parka sits up over his head, shielding him from the cold as he studies the little pile of gray fluff that is the only brood of snowy owl chicks to have hatched in the 400-square-kilometer study area that he has been monitoring for more than three decades. Muttering measurement details under his breath, which he records in his field notebook, Holt inspects each tiny owlet as he pulls it from the pile to clicks and chirps of protest. The father owl, perched on a distant knoll, heartedly hoots his disapproval of our presence—his mate, sitting atop a telephone pole beyond, is observably anxious for us to leave.

After measuring and inspecting each of the chicks, Holt places tiny little metallic bands on them so that months or years from now they might be identified and provide a window into the lives they have led, the places they have been, and what brought them to the end of their lives. From this tiny mound of grass, the owls may one day find their way across the Arctic Circle, or even down to America's Lower 48, as many of them scatter south during the winter months, beautiful white ambassadors of the Arctic.

Snowy owls are certainly seen as denizens of the frozen far north, but more important, they sit atop a fragile ecosystem as an apex species, representing in their strength and numbers the health of the very world of which they are a part. Unfortunately, from Holt's decades of study, it is clear snowy owl numbers have dwindled in recent years in the areas he observes, raising the question of what becomes of the Arctic in the face of our changing climate—a proverbial canary in the coal mine.

For now, at least, Holt isn't much concerned with possible future outcomes, but rather about whether these six little chicks will make it through the summer, hopefully to the point of fledging. We slowly step away from the nest, stopping every hundred meters to check on the nest and the two adults. Peering through binoculars, Holt confirms the mother has returned to her brood, while the father continues to assess whether or not we remain a threat, before resuming his hunt for lemmings to feed a hungry family.

The tiny outpost once known as Barrow, Alaska, has changed little since Holt first stepped off the plane in the spring of 1991,

OPENING SPREAD: A MALE SNOWY OWL TAKES OFF FROM HIS NEST AFTER DELIVERING A LEMMING TO HIS PARTNER AND THEIR CHICKS. FACING PAGE: DENVER HOLT ATOP A MAKESHIFT OBSERVATION PLATFORM BUILT FROM OLD POWER LINE POLES.

BARROW
WHALERS

with hopes of studying this iconic Arctic species that he had become fascinated by years before. In 2016, in a narrow referendum, the city was returned to its original Iñupiaq name, Utqiaġvik, which means "a place to gather wild roots"—although there seems to be some contention around whether or not it was actually called Ukpiaġvik, which means "the place where snowy owls are hunted."

What was once a city defined by the oil extraction that has come to be synonymous with the North Slope, and the military base established near Point Barrow at the turn of the century, it has taken a turn back toward the wild appeal of the Iñupiat people who have called this northernmost spit of land in the continental United States home for more than 1,500 years. With this renewed focus on wildlife, conservation, and climate science, this outpost has become a beacon for ecotourists who fly in from across the globe on one of two daily flights from Anchorage, and a cadre of scientists, who, like Holt, have found what was once known as Barrow to be an ideal laboratory for studying the impacts of climate change on just about everything, from the melting permafrost to the fauna that thrive in this extreme of environment—from tiny lemmings, to polar bears, walruses, whales, and snowy owls.

Yet, unlike many of the other scientists drawn to the tundra surrounding Utqiaġvik, Holt is here not under the banner of a university or government, but rather of his own volition with resources provided by the Owl Research Institute, which he founded 33 years ago. In a jovial manner, he chides his

PREVIOUS SPREAD: POINT BARROW, THE MOST NORTHERN SPIT OF LAND IN THE CONTINENTAL UNITED STATES, REACHES OUT INTO THE PACK ICE STILL THICK ON SHORE. FACING PAGE: A TINY SNOWY OWL CHICK PEAKS IT'S HEAD ABOVE THE FLUFFY MOUND OF ITS SIBLINGS FOR A MOMENT AS DENVER HOLT EXAMINES THE CLUTCH OF NEWLY HATCHED OWLETS.

peers in the field of wildlife biology who come out to study the natural world for a few field seasons, only to return to labs and offices to pen papers for publication, building academic careers after but a brief residence in the wild upon which they muse for the remainder of their lives.

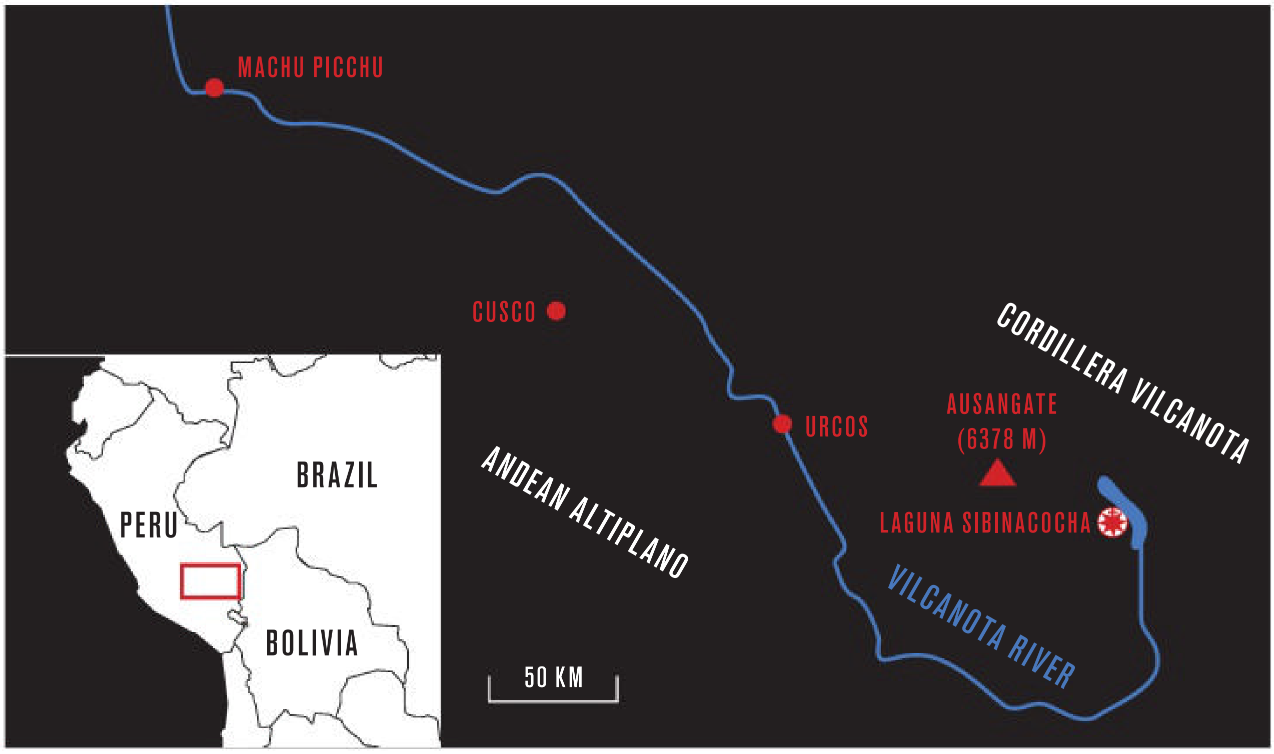
While Holt has certainly spent his fair share of time compiling his years of field research for publication—not only on the snowy owl, but also nine other species of owls across North America—he sees his work in a different light, hoping that it goes far beyond the pages of academic journals, which is why he has devoted so much time to public outreach. Seated in an empty classroom in the Barrow Arctic Research Center at the edge of town, rain and wind buffeting the tundra outside, Holt works to freshen a speech that he has given hundreds of times around the globe. He looks up for a moment and chuckles to himself, “Those little chicks are probably hunkered down under their mom in this weather, just trying to stay warm.” As he flips through years of photographs, piecing together a new PowerPoint, he pulls me in to look closer at some of the amazing pictures of owls he has collected from the many photographers who have joined him in the field over the years. Living a life dedicated to something that will never reciprocate your love may seem lonely at first glance, yet for Holt it is the most beautiful existence he can imagine. Packing up his bag and donning his parka for the cold, wet drive back into town, he jovially exclaims, “Not everyone is getting to do this today!” I can’t help but agree.

FINDING AN IDEAL HUNTING PERCH ATOP AN OLD IÑUPIAT CABIN, A FEMALE SNOWY OWL LOOKS FOR LEMMINGS MAKING THEIR WAY THROUGH THE TUNDRA GRASS.

THE SERPENT *AND* THE FROG

searching for the Temple of Ausangate

by **PRESTON SOWELL**



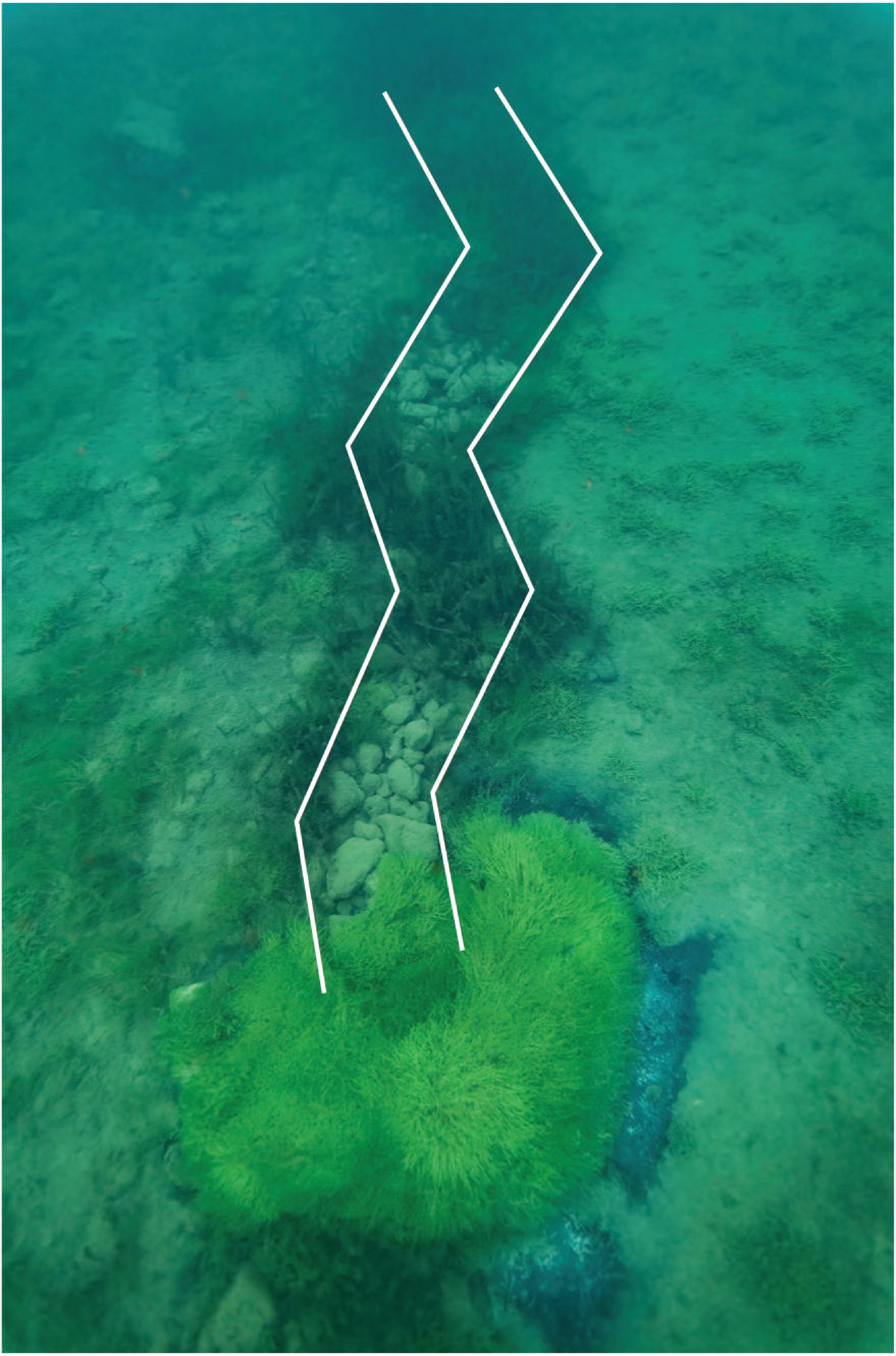
A FELLOW OF THE EXPLORERS CLUB SINCE 2017, PRESTON SOWELL IS AN ENVIRONMENTAL SCIENTIST, CEO OF THE ENVIRONMENTAL CONSULTING FIRM GEOTIC SOLUTIONS, A NATURALIST, AND PHOTOGRAPHER. WHEN NOT CONSULTING FOR THE FEDERAL GOVERNMENT, PRESTON USES HIS SCIENTIFIC AND MOUNTAINEERING EXPERTISE TO SUPPORT RESEARCH EXPEDITIONS STUDYING HIGH-ALTITUDE ECOSYSTEMS AND ENVIRONMENTAL RESPONSES TO CLIMATE CHANGE. HE IS ALSO CEO OF THE SIBINACOCHA WATERSHED PROJECT (WWW.SIBINACOCHA.ORG). HIS WORK TO USE AN ARCHAEOLOGICAL DISCOVERY TO PROTECT A THREATENED WATERSHED IS THE SUBJECT OF THE 2020 NATIONAL GEOGRAPHIC DOCUMENTARY *LOST TEMPLE OF THE INCA*.

Lying at 4,800 meters in the Cordillera Vilcanota range of southeastern Peru and the headwaters of the Amazon River, Sibinacocha is the largest high-alpine lake in South America. Surrounded by 6,000-meter-high glaciated peaks, the Sibinacocha watershed is an extreme environment by any standard, yet it contains stunning natural beauty and a remarkable array of wildlife, many at their highest-known elevations. As climate change and rapid deglaciation occurs, the watershed serves as a living laboratory for research on alpine ecology—studies I have supported for years as a field scientist. Under grants from the Denver Zoological Foundation, I even documented the endangered Andean mountain cat (*Leopardus jacobita*), or the "snow leopard of the Andes." It is the rarest cat found in the Americas and it is the perfect ambassador species for its high-elevation environment. The 18-kilometer-long, 100-meter-deep lake itself is full of life, yet this remote body of water has never received a biological survey.

Alarmingly, like many parts of the Andes, the small watershed feeding Sibinacocha has come under threat from mining. By the time that I had first visited the Vilcanota in 2002,

OPENING SPREAD: EXPEDITION MEMBERS NEIL MICHELUTTI AND CHRIS GROOMS, BOTH OF QUEEN'S UNIVERSITY, COLLECT A SEDIMENT CORE FROM LAKE SIBINACOCHA WITH THE 6,049-METER PEAK YAYAMARI LOOMING IN THE BACKGROUND. FACING PAGE: GEORGE WATSON EXAMINES THE HEAD OF THE ZIGZAG SNAKE STRUCTURE. ALL IMAGES THIS STORY BY PRESTON SOWELL, UNLESS OTHERWISE NOTED.

SEALINE
TOHATSU
SEALINE



local efforts had been initiated to protect it for its biological diversity and critical water source, but official mining concessions had already been granted across the area. I felt an additional urgency to protect the watershed in 2006 after I glimpsed what was potentially a new species of aquatic frog, possibly unique to Sibinacocha and unknown to science; however, it also looked similar to the critically endangered Lake Titicaca water frog (*Telmatobius culeus*).

Whether it is a new species or part of an introduced population of the Titicaca frog (they are smuggled throughout Peru), scientific documentation of the amphibian is essential. After not finding it near the shoreline on subsequent expeditions, in 2011, I brought a wetsuit, mask, and snorkel, thinking that my new frog might prefer deeper waters. As I swam out at the last location I'd chosen to search, 25 meters from shore I found myself looking down at rock structures and other artifacts, including intact pots, 5 meters below me.

We had long heard locals talk about Cuzcopampa, a village that was reportedly inundated by a great flood wrought by an angry deity. The available literature, however, made no mention of a such a site in the area, which remained a virtual blank spot on the archaeological map, and perhaps for good reason. Horses are required to carry the gear, and the high altitude ensures that nothing significant is accomplished without specialized equipment and a hefty dose of suffering. Thinking that the ruins and artifacts, if significant, could help protect the area, I tried unsuccessfully to get the archaeological community involved.

Consequently, I documented everything that I could find, hoping a preponderance of evidence might turn some heads. A small, inflatable boat allowed me to examine a bit more of the area without becoming hypothermic in the icy water. I discovered that one of the stone structures was of a serpentine nature, forming a zigzag more than 100 meters long, with a large pile of stones at one end. It's the symbol for a snake in Andean cultures, as well as rivers and water; a sacred symbol that is found at nearly every important Inca site in Peru.

Excited by my discovery, I was eager to recruit divers to document the submerged structures, as well as the adjacent pots. Enthusiastic participation, however, quickly soured once they realized that surveying the site would require diving at 4,800 meters above sea level, radically changing the calculus when it comes to decompression times and other working parameters. Out of options, I decided I would have to get certified, which I did with the help of a technical cave diver and friend, George Watson. As it turns out, cave divers have just the right combination of moxie and training for the job. And, in 2013, we pulled together a small expedition and conducted a series of reconnaissance dives in the lake; my thirteenth dive apparently set a world record for depth at altitude.

From our photos, ceramics experts were convinced that submerged pots were indeed pre-Hispanic and were likely offering vessels. The question was, how did they wind up 5 meters under water? An examination of the region's climate history revealed a potential answer.

The submerged remains were likely of a site built during a known period of extreme drought, only to be flooded when regional lake levels abruptly rose. Although Sibinacocha was dammed in 1992, the lake level only rose about 2 meters, and historical aerial photographs confirmed the structures had been submerged by 1931. Given the seemingly sacred nature of the architecture and presence of possible offering pots, I suspected that we had found the remains of a ceremonial site.

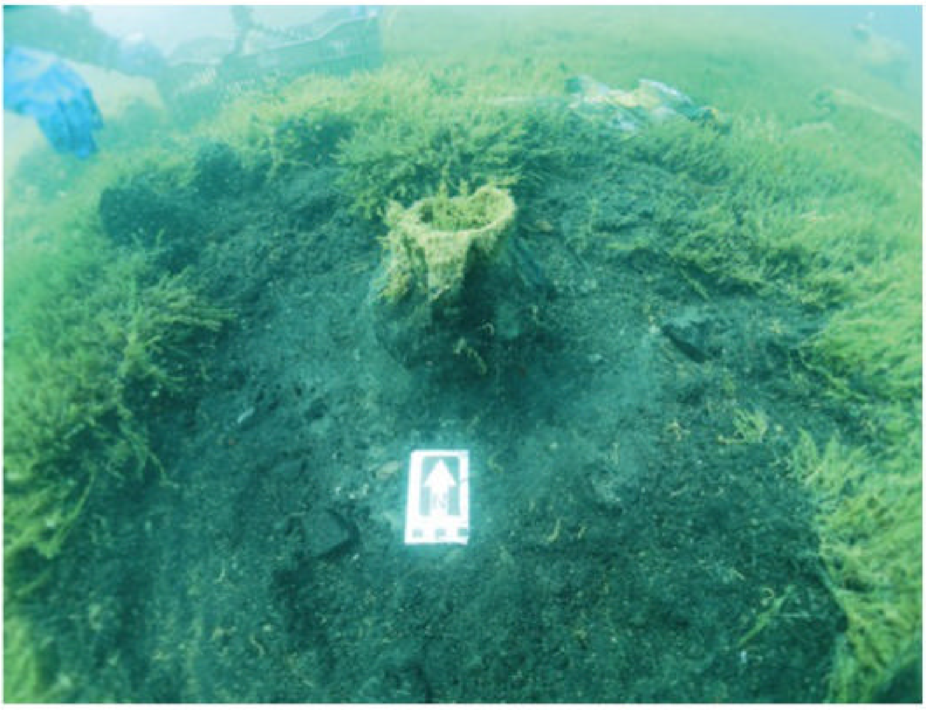
PREVIOUS SPREAD: THE AUTHOR BEING TRANSPORTED BETWEEN DIVE SITES BY THE SEDIMENT CORING TEAM DURING A SNOWSTORM. FACING PAGE: THE SUBMERGED ZIGZAG STRUCTURE AS IT APPEARED IN 2013.

Not long after, I had the good fortune to be introduced to archaeologist Johan Reinhard, who has made quite a name for himself for his work on high-altitude Inca sites in the Andes. Perhaps more important, so far as I was concerned, he was one of the few in the world who has done dives at an even higher elevations—having conducted an underwater survey of a site within the crater of the 5,900-meter Licancabur volcano in the Chilean Atacama Desert. It just so happened that Sibinacocha was one of the few places that he hadn't visited. Reinhard told me of a story that had been recorded by the early sixteenth-century Inca chronicler Pedro Cieza de León that mentioned Ausangate, a temple built by the Cavinas people, which was located near a large lake. The lake, he explained, was considered a *paqarina*, or place of origin, by the Cavinas, and the temple remained an important place of worship even after they had been subjugated by the Inca. While the temple was well-known in the literature, it was one of the few that had not yet been found, although more than one scholar had suspected that the Cavinas's lake was most likely Sibinacocha, and for good reason. Just west of Sibinacocha lies the sacred 6,400-meter mountain *apu* (natural deity) Ausangate, the temple's namesake. Sibinacocha is by far the largest body of water near Ausangate and even today is considered an important regional *apu*. The historical home of the Cavinas is the modern village of Urcos, located next to the Vilcanota River, and that river has its primary source at Sibinacocha.

With the information that I'd gathered, I secured a small National Geographic grant, and I recruited Carlos Ausejo, one of the two underwater archaeologists then working in Peru. Our 2015 expedition was exceedingly

OUR EXPEDITION *ARRIEROS* (HORSE WRANGLERS) AND HORSES HEAD INTO THE SIBINACOCHA WATERSHED.

CLOCKWISE FROM TOP LEFT: TENTS AT YAYAMARI BASECAMP; A STRUCTURE ON THE EAST SHORE OF SIBINACOCHA; OFFERING POT IN SITU NEAR THE ZIGZAG STRUCTURE; LITHIC POINTS RECOVERED FROM A SITE NEAR YAYAMARI, PHOTOGRAPH BY PETE TAKEDA; PERUVIAN ARCHAEOLOGIST ARTURO RIVERA HOLDS A MINIATURE OFFERING VASE RECOVERED FROM SIBINACOCHA; JAMES WILLAMS, THE AUTHOR, AND HENRIK PEDERSEN PREPARE TO DIVE, PHOTOGRAPH BY JAMES WILLIAMS.


N

productive. Carlos, though initially skeptical, was convinced of the site's significance on our first dive. Carlos's land survey team identified 42 structures and numerous points, stone tools, and ceramic fragments, including a miniature vase with a zigzag motif—an apparent offering that had been thrown into the lake. Carlos's team dated the ceramic fragments to the pre-Inca, Inca (ca. 400–1532 CE), and colonial periods (1532–1800 CE). Some of the stone projectile points have been tentatively dated to the formative period (2500 BCE–200 CE), indicating a very long human presence in this high-altitude basin.

A follow-on 2016 grant-funded expedition further documented the extent and construction of the underwater features, and the land survey team collected even more ceramics and stone points. I also sent a team of archaeologists to a complex of structures that I'd previously visited on the eastern shore of Sibinacocha, in the shadow of a 6,049-meter peak known as Yayamari. They returned excited, thinking that it was the most significant site we'd discovered to date, and most likely of Inca construction. They even documented a stone monolith possibly shaped to mimic Yayamari's profile above. And, from that location, Ausangate itself is visible to the west.

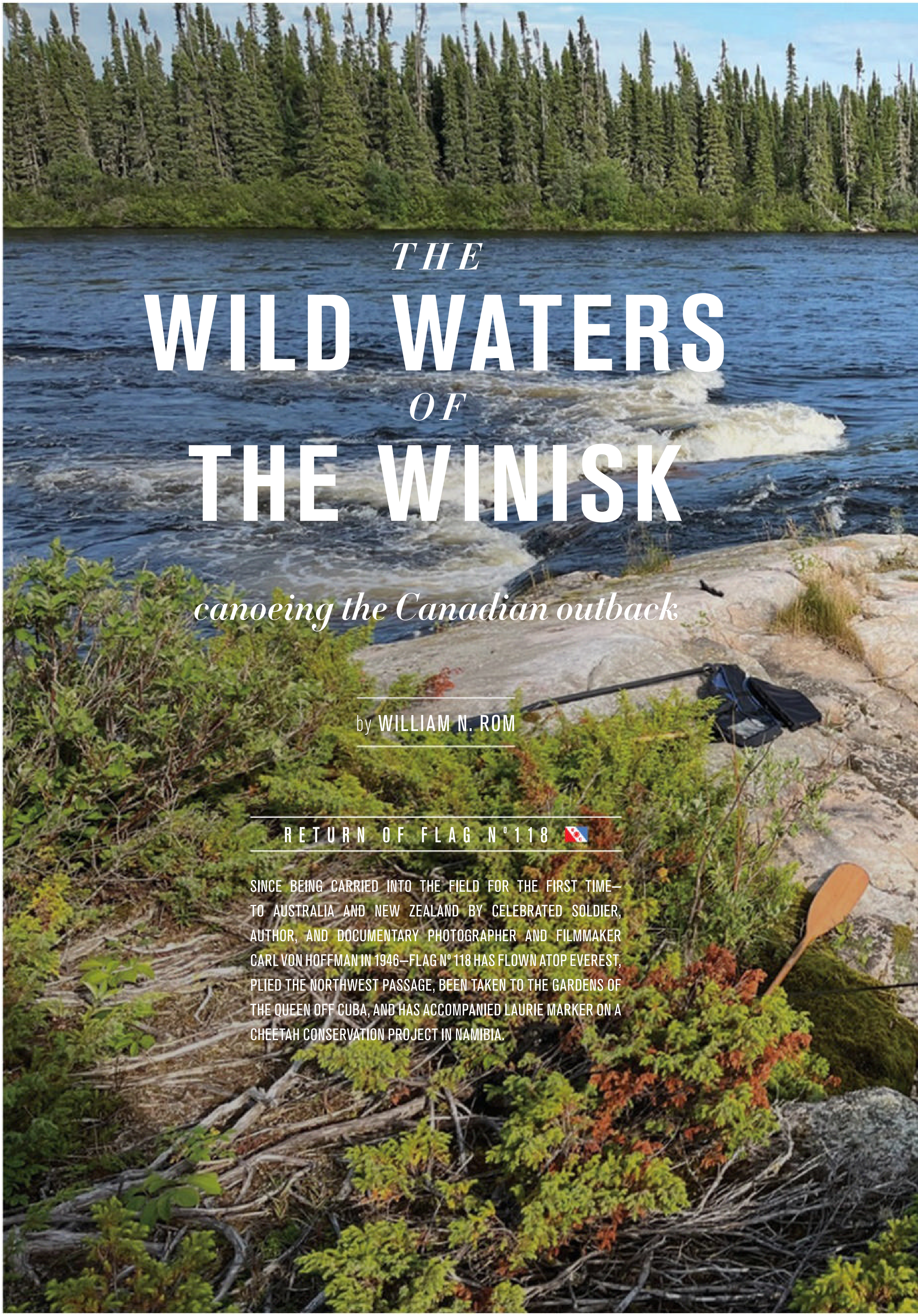
In 2017, we returned to the site and recovered one of the submerged pots located alongside the zigzag structure. It was remarkably intact and contained three stones. A ceramics specialist has dated it to the late intermediate period (ca. 1000–1400 CE), however the origin and meaning of the stones within it have yet to be determined. At least two additional terrestrial structures have been identified as *chullpas*, or tomb chambers. One of them, located high on the slopes of a mountain, is large enough to be for a family unit and/or a person of importance.

In 2019, with funding from Washington University in St. Louis, we were able to embark on the first formal excavations at Sibinacocha, led by Sarah Baitzel, an anthropologist who, for years, has been working at sites on Peru's southern coast. She brought together a team of volunteers who set to work on the complex of buildings we identified in the shadow of Yayamari. Given the challenges of working at such elevations, only a few of the planned test pits were actually excavated. Of the structures that were investigated, little more has been revealed, leaving us with an intimidating amount of work still to do at Sibinacocha—and we have yet to find the temple of Ausangate, if indeed it has survived.

At the beginning of 2020, covid put an abrupt halt on my work at Sibinacocha—as well as the funds for such out-of-the-box investigations. In the meantime, we've had conservation successes. After many years of difficult work by organizations like Conservación Amazónica (ACCA), the lake and 66,000 hectares of the watershed were protected in 2019 as the Ausangate Regional Conservation Area. I have also been working with a team of paleoecologists and climatologists from Queen's University and Washington University in St. Louis to collect sediment cores in the lake in an attempt to better understand the lake's history, including changes in its water levels.

Unfortunately, the cultural features remain unprotected and exploratory mining operations are still being conducted in the region (though the community is fighting back!). Climate change-induced fluctuations in water levels are causing aquatic vegetation to inundate the underwater structures and cover the surrounding artifacts. But with the help of Peru's next generation of underwater archaeologists, we plan to return to Sibinacocha as soon as possible to study and recover what we can. And, if we get lucky, perhaps we'll even find my frog there, hidden within those ancient walls.

THE *APU* AUSANGATE AS SEEN FROM THE EAST.



THE WILD WATERS OF THE WINISK

canoeing the Canadian outback

by WILLIAM N. ROM

RETURN OF FLAG Nº118

SINCE BEING CARRIED INTO THE FIELD FOR THE FIRST TIME—TO AUSTRALIA AND NEW ZEALAND BY CELEBRATED SOLDIER, AUTHOR, AND DOCUMENTARY PHOTOGRAPHER AND FILMMAKER CARL VON HOFFMAN IN 1946—FLAG Nº 118 HAS FLOWN ATOP EVEREST, PLIED THE NORTHWEST PASSAGE, BEEN TAKEN TO THE GARDENS OF THE QUEEN OFF CUBA, AND HAS ACCOMPANIED LAURIE MARKER ON A CHEETAH CONSERVATION PROJECT IN NAMIBIA.

A FELLOW OF THE EXPLORERS CLUB SINCE 1991, WILLIAM N. ROM, MD, MPH, HAS LED A NUMBER OF FLAG EXPEDITIONS, INCLUDING A CROSSING OF SOUTH GEORGIA, FOLLOWING THE ROUTE OF SIR ERNEST SHACKLETON; PARTICIPATING IN A SPRING HUNT WITH THE THULE INUIT; AND A SUMMITING OF MT. GELADAINDONG, THE SOURCE OF THE YANGTZE RIVER. THE DIRECTOR OF PULMONARY AND CRITICAL CARE AT NYU/BELLEVUE FOR SOME 25 YEARS, HE ALSO TEACHES COURSES ON ENVIRONMENTAL HEALTH AND CLIMATE CHANGE AT NYU'S SCHOOL OF GLOBAL PUBLIC HEALTH. ROM GREW UP AS A WILDERNESS CANOE GUIDE IN THE BOUNDARY WATERS OF MINNESOTA AND IN QUETICO PROVINCIAL PARK IN ONTARIO. HE HAS ALSO CANOED ACROSS NORTHERN CANADA, HAVING PLIED SIX OF ITS WILDEST RIVERS.

THE WINISK RIVER

The Winisk is a wild, 475-kilometer-long river that flows from the northlands of Ontario into Hudson Bay, draining vast swaths of peatland that store millions of tons of carbon along the way. The Winisk had been on my bucket list for at least the past four decades—my having already paddled its neighbors to the east and west: the Albany, Churchill, Nahanni, Back, and Alsek rivers in the Canadian north. These rivers were as wild as when the fur traders explored them in the early eighteenth century—now they may tell us what has changed as global warming increases and biodiversity declines.

This past July, two of my paddling buddies—Bob Wade and Ronald Bayens—and I were able to make that dream a reality when we pulled together an expedition to ply the turbulent waters of the Winisk—the river's name Cree for "groundhog." Ahead of the trip, we purchased a single 5.5-meter, three-person Souris River kevlar canoe in Ely, Minnesota, and drove to Nakina, Ontario. There, we chartered a single-engine Otter on floats to fly us into Webequie, a Cree nation located on an isthmus in Winisk Lake where we would begin our journey. Our goal was to descend the dangerous Winisk with its more than 150 kilometers of rapids.

Webequie is one of 31 Cree nations in northern Canada. In my travels in the region since 1965, I have come to know the Cree well enough for them to share their stories. They live on fish, caribou, and geese; in conversations on this trip, they noted that northern pike were moving northward as they retrieved them from their gill nets. As they hunt caribou migrating in herds, they now say there is a pronounced northward migration in vegetation into the Hudson Bay Lowlands. And the tamarack trees are also moving northward, along with aspen and black spruce. In addition to achieving my personal objective of paddling the river, we also hoped to bear witness to these environmental changes firsthand as we made our way to Peawanuck, another Cree nation some 20 kilometers inland from the river's terminus in Hudson Bay.

PREVIOUS SPREAD: THE EXPEDITION'S KEVLAR CANOE TIED UP ALONG A ROCKY LEDGE. FACING PAGE: WINISK RIVER RAPIDS AT THE OUTFLOW OF WINISK LAKE. ALL IMAGES THIS STORY COURTESY WILLIAM ROM.

Experienced paddlers, we were up for adventure and indeed we would find it over the course of nearly a fortnight on the river.

Shortly after our arrival in Webequie, we paddled north across the lake to the Winisk River outlet to begin our descent of the river. Some 207 meters above sea level and 400 meters across, the outlet was rife with massive rapids with record-high water flow levels. We decided to portage the canoe and our gear past this first stretch of white water, observing the rushing torrents through the alder bushes that grew densely along the shoreline. We soon discovered that if we put in and hugged the shoreline, we would be able navigate the rapids and eddies, all the while avoiding the swift main current, which roared down the center and one side of the river. This technique worked well except when we reached rapids or falls that spread across the entire river, requiring a careful reconnaissance as we approached. We would then portage through the alders and tamaracks along the edge of the river. On one occasion we all climbed a steep hill and used our climbing rope to hoist the canoe up.

Two days into the trip, we reached Bear Head Lake, below which the river braided among a series of islands, where we bore to the right as the main current veered left. Spying a small tributary to our right, which had a lot of protruding rocks, we steered our canoe left along a smooth slick of water. Unexpectedly, however, we were swept into a hole with water pouring over the left gunnel. The canoe flipped over as it ascended a rock under the swift water. Bob and Ron were thrown out of the canoe past the swift rapids and were able to reach the shore whereas I continued to hold onto the canoe. Moments later, I heard a scrunch as the boat scraped

BOB WADE PUSHES THE CANOE UP A STEEP GRADE DURING A PORTAGE AROUND WYE RAPIDS.

rocks and was caught upside down on top of a rock in the middle of the rapids. Within earshot I heard them yell, “Let go of the canoe!” And as I did, I was lost in bubbles and torrent. Realizing I was underwater, I held my breath, and pushed my feet downstream to protect my head from hitting any rocks, until my life jacket jerked me upward and I could breathe. As I was being swept down river below the rapids with one paddle in hand, I spotted the second of our paddles, grabbed it, and began stroking toward shore only to see it move away. Adrift, I turned and swam toward the distant far shore, and kicked, floated, and sidestroked for an hour before reaching a calm embayment.

When I came ashore, Bob and Ron were nowhere to be seen. Summoning energy, I hiked along the riverbank back several kilometers to where I had lost hold of the canoe, only to hear a “hello” beckoning. I returned the call and found Bob emptying the canoe of water. He had been able to hike to the beginning of the rapids, jump in, and swim out to grasp the upside-down canoe by a thwart, and, using his adrenaline-fueled body, flipped it upright and guided it to an eddy below the rapids. Ron had cut down a small tree with the aid of his Leatherman and sat on the tree crossing the rapids to join us below the eddy.

Luckily, we found that everything except Ron’s day pack had remained intact and safe in our drybags and that we had our three paddles. We boarded the boat and paddled downriver to dry out our gear and pitch a camp for the evening. Although Ron’s satellite phone was lost in his day pack, Bob’s had been safely tucked away so he was able to text his wife to report that we were “carefully negotiating the rapids!” As soon as we made camp, Bob prepared a supper of freeze-dried pad thai and liquid chocolate cheesecake that consoled our wounded egos.

The next few days we cautiously negotiated Wye Rapids, bushwhacking portages since there were no trails on the remote Winisk River. The only evidence of human presence were two cabins built of spruce logs, which the Cree used for goose hunting in the fall. While we never overnighted in the cabins, Ron found within one of them a kettle that we snagged for making hot tea and soup.

When we reached Tashka Rapids, we found a narrow trail, then crossed the swift river to the left side to portage around Baskineig Falls—both rapids, graded 5-6 collectively, dropped some 45 meters. Prior to our trip, Ron had marked best routes for portages on Canadian maps where we had found records from earlier intrepid canoeists. Tashka was the king of rapids, with a smooth slick in the center with boiling rolls and treacherous eddies on each side, making for a dangerous combination. Bob tossed a tree into the rapids to see if it could make its way down. Within moments, we lost sight of it.

At night we found that we were anything but alone as we tried to sleep. Mosquitoes easily buzzed their way into our tent; black flies densely surrounded its door; and no-see-ums found passage into our sleeping bags through the crevice we were breathing. Head nets were required around camp. This was true for the entire trip, but toward the end we finally learned that immediately after pitching the tent one could lie in it and swat bugs until it was bug-free.

After a week of negotiating endless rapids, we reached Seashell Rapids, which were wide, rocky, and decorated with high limestone cliffs that looked like curvy clamshells standing on end. We reconnoitered and determined that we would descend to the edge of a rocky island and then portage over it, and, if we were lucky, we would reach the bottom of the rapids at the far end. The river was so high that Bend Rapids and Gneiss

BOB WADE TOSSES A TREE INTO TASHKA RAPIDS TO GAUGE THEIR FEROCITY.

Rapids were almost obliterated, affording us a fast-paddle descent. The next few days were almost enjoyable with blue skies, no more rapids to negotiate, and shorelines that had been cleared by ice so we could stop and stretch our legs. We saw a woodland caribou as well as a bald eagle after nearly every turn that made us wonder if it was the same bird following us downstream. We fished in several of the river's tributaries, catching a walleye pike, but no speckled trout. We had been too intense on safely paddling the rapids and finding places to carry that we hadn't stopped for fishing earlier in the expedition. Several places along the river, I noted masses of floating tundra in the river with trees still attached, which may have been released from thawing permafrost.

At the end of the twelfth day of the expedition, in a dreary cold rainstorm, we spied a dock and a series of Quebec-made Norwest boats, signifying we had reached our destination—the village of Peawanuck, which was established in 1986 after ice dams had destroyed the Cree nation's prior hometown of Winisk further downstream.

About 350 Cree live in the village in prefabricated dwellings and have all-terrain vehicles and pickup trucks they can use on a road that runs along Hudson Bay from Fort Severn when the ground freezes during the winter months. The cookie-cutter houses were all-electric and had concrete basements to stabilized them against thawing permafrost.

We met our host, Maurice Mack, who welcomed us to our temporary home. The following day he took us by boat to his goose hunting cabin on the upland shore of Hudson Bay, in what is now Polar Bear Provincial Park. At nearly 2.4 million hectares, it is Ontario's largest preserve, and home to more than 200 polar bears. It was there that we learned more about the northward march of shrubs toward the tundra and heard stories of the migration of prized northern pike due to climate change. In our conversations with Cree elders, they told us about far more snow and the extreme cold they had experienced when they lived in Winisk, prior to its destruction in 1986. Maurice also told us that the yearly September snowstorms, in what was once his old village, no longer occurred.

We loaded our safety rifles and hiked out on the tidal flats, hoping to find and observe polar bears in the wild. While it was foggy and rainy, reducing our chances for seeing anything, Maurice was able to spot a polar bear and her cub through his binoculars.

Maurice told us that, despite the environmental changes, the Cree had yet to sense the polar bears' decline in numbers or any malnutrition, even though this has been documented along the west coast of Hudson Bay near Churchill. The Hudson Bay polar bears have diverged into their own subspecies, and patiently wait for the fall ice to form to hunt seals as they migrate northward along the coast. Maurice regaled us with stories of polar bears walking upriver on the Winisk and actually hassling hunters there.

Back in Peawanuck village, we found ourselves stormbound in one of the prefab dwellings and feasting on caribou. Once the weather cleared, four days later, we were wheels up, leaving our excellent canoe with Maurice and our newfound friends while carrying a care package of caribou home.

We were delighted to have accomplished our goal of canoeing the mighty swollen Winisk yet came away feeling disturbed by the stories we heard regarding the changing environment, which is sure to compound the challenging conditions for the polar bears in the years ahead.

CLOCKWISE FROM TOP: RON BAYENS PADDLES A PLACID STRETCH OF THE WINISK NEAR OUR JOURNEY'S END; THE THREE PADDLERS WITH EXPLORERS CLUB FLAG Nº118; THE ROILING WATERS OF WYE RAPIDS.

HARVESTING THE WILD

savoring survival

by LES STROUD and CHEF PAUL ROGALSKI

sweet-and-sour rock tripe soup

SERVES 4-6

AS LONG AS I HAVE BEEN TEACHING SURVIVAL, I HAVE BEEN TOUTING ROCK TRIPE AS ONE OF THE ULTIMATE SURVIVAL FOODS—THE LICHENS OF THE GENUS *UMBILICARIA* HAVING GAINED FAME FOR KEEPING THE FRANKLIN EXPEDITION FROM STARVING TO DEATH ON AT LEAST ONE OCCASION. OFTEN, A WILD EDIBLE LOOKS ANYTHING BUT, AND THIS IS CERTAINLY THE CASE WITH ROCK TRIPE. FOUND GROWING ON ROCKS THROUGHOUT NORTHERN NORTH AMERICA, ROCK TRIPE RESEMBLES ASPHALT SHINGLES IN ITS APPEARANCE, WITH A DARK, ROUGH UPPER SIDE AND A SMOOTH, GREEN UNDERSIDE, AND HAS THE LESS-THAN-ENTICING RUBBERY TEXTURE OF SEAWEED. HOWEVER, LEAVE IT TO THE BRILLIANCE OF CHEF PAUL TO TURN WHAT I HAVE ONLY EVER KNOWN TO BE A LEATHERY, CHEWY, NOODLE-TYPE OF PLANT INTO SOMETHING TENDER AND DELICIOUS. IN ONE MEAL, HE FOREVER ALTERED MY OPINION OF THE MUCH-MALIGNED ROCK TRIPE!

TO COOK THIS SOUP, YOU WILL NEED A STURDY GRILL, ONE THAT, WHEN SET UP OVER AN OPEN FIRE, IS STRONG ENOUGH TO HANDLE THE WEIGHT OF A LARGE WOK OR COOKING POT.

INGREDIENTS

2	cups rock tripe, thinly sliced
1	cup yellow onion, diced
1	clove of garlic, chopped
1	cup celery, diced
1	quart vegetable or poultry stock
½	cup sweet fern leaves
1	cup soy sauce
1	cup vinegar
1	cup brown sugar
1	dash of salt

Put rock tripe, onions, garlic, celery, and stock in a large pot. Bring to a simmer, add the sweet fern leaves, and cook for an additional 5 to 10 minutes or until vegetables are somewhat soft. Stir in soy sauce, vinegar, and brown sugar. Season with salt to taste. Serve hot.

EXTREME MEDICINE

YOUR HEALTH AND SAFETY IN THE FIELD

is there a doctor on the plane?

how to render medical assistance

by **MICHAEL J. MANYAK, MD, FACS**

I think many of you have been on public transport or at an event where there has been a call for medical assistance. This has happened at least a dozen times to me under variable circumstances. Responders often come in varying sizes and shapes: you may have a pediatrician or a psychiatrist show up with little experience with adult emergency medicine. But what happens if there are no medical personnel at the event?

Let's look at airline flights for example. There is not rapid access to the other resources available on land or on a cruise ship where there is usually some type of medical staff. First, know your population cohort. In most cases, airline passengers are representative of the general population, meaning that anyone could have an emergency at any time.

Interestingly, a recent *New England Journal of Medicine* study revealed that a medical emergency occurred in one per 604 flights, as determined by in-flight medical emergencies resulting in calls to a physician-directed medical communications center. Authors reviewed records of 11,920 in-flight medical emergencies between 2008 and 2010. Physician passengers provided medical assistance in nearly half of in-flight emergencies and flights were diverted because of the emergency in 7.3 percent of cases.

The study mirrors my personal experience. More than a third of in-flight emergencies involved syncope (fainting or passing out) or presyncope, followed by respiratory symptoms in about 10 percent and the same for nausea or vomiting. Cardiac events and seizures are the cause in about 5 to 7 percent. Abdominal pain, infectious diseases, psychiatric problems, and allergic reactions each account for less than 5 percent.

If you are a doctor, the first thing is to identify yourself as a physician, and, importantly, what type. Once you have established that you are capable to assist, ask the flight attendant to keep other passengers and onlookers away from the area. Have the flight attendants determine if there are others on the flight with medical experience. Once you determine the problem, you may have the flight attendants "crowdsource" things not readily available, like a pulse oximeter or even aspirin.

Ask those accompanying the victim to help with medical history, particularly if the patient is unresponsive. Determine, if you can, if this is a first-time or recurring event. Ask the victim or companions about any medical problems or medications the victim may be on. Medications can give you a clue even if the patient cannot. Take an inventory of their complaints, including chest or arm pain, shortness of breath, loss of consciousness, fever, or respiratory symptoms. Assess the victim's orientation to time, place, and date. Make the patient comfortable. Reassure both patient and family or companions that assistance is imminent.

The responder is a key component of the medical team, which also includes medical ground control and the flight attendants. Requirements may vary among airlines, but all flight attendants are trained in cardiopulmonary resuscitation (CPR), as well as the use of automated external defibrillators (AEDs). Work with the pilot and flight attendants to contact a physician call center to provide additional remote assistance.

Airplanes usually have an emergency medical kit (EMK), an oxygen tank, and an AED, though small commuter flights may not have much. Minimum EMK contents are mandated by the Federal Aviation Administration. Standard equipment includes a stethoscope, a blood pressure cuff, and three sizes of oropharyngeal airways; self-inflating manual resuscitation devices and CPR masks in three sizes; alcohol sponges, gloves, adhesive tape, scissors, and a tourniquet; as well as saline solution, needles, syringes, and an IV administration set consisting of tubing and two Y connectors (if you are lucky).

An EMK usually contains medications such as nonnarcotic analgesic tablets, oral antihistamines, an injectable antihistamine, atropine, aspirin tablets, a bronchodilator, and injectable epinephrine. Nitroglycerin tablets and 5cc of 20mg/mL injectable cardiac lidocaine are also part of the mandated kit. Extras may include EpiPens for adults and children, as well as opioid reversal medication (naloxone) and glucose for managing low blood sugar. Antiemetics may also be available.

Note that physicians are not obligated to assist during an in-flight medical emergency. Under U.S. law, a bystander assisting in an emergency is generally protected by Good Samaritan laws unless guilty of gross negligence. Laws for international airlines generally conform to this principle. The Aviation Medical Assistance Act also protects the airline itself if the carrier in good faith believes that the responder is a medically qualified individual.

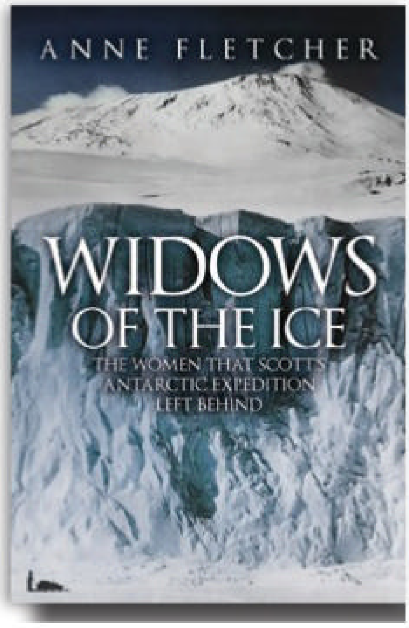
I will close with a personal story. On a short flight to Bermuda, I responded to find a passenger in the back of the plane. He was overweight, pale, sweating profusely, and had shortness of breath. He had chest pain radiating down his left arm. Although he had no history of heart problems, this was the classic presentation of an acute myocardial infarction, a heart attack.

We controlled the scene and placed him flat with a blanket and the flight attendants kept everyone out of this area. We notified the captain that we needed an ambulance waiting for us on the tarmac upon landing. There was very little emergency equipment on the plane and running an arrest on the plane would be impossible. I told the flight attendants to ask passengers if anyone had aspirin. A myocardial infarct usually involves a blood clot in one or more cardiac vessels and an aspirin would interfere with platelet function and clot propagation. The flight attendant came rushing back with an aspirin, which I gave the patient with a sip of water. He still had the chest pain but it had diminished when we landed.

Afterward, American Airlines contacted me to thank me for my assistance. I wondered about the outcome but did not receive any feedback. Then, three months later, I received a letter from the patient with big letters Thank you! Thank you! Thank you! He went on to explain he had sustained a massive myocardial infarction and the ER staff and cardiology team told him I saved his life by giving the aspirin in the middle of the event. That is all the thanks I needed!

BOOK REVIEWS

EDITED BY MILBRY C. POLK



WIDOWS OF THE ICE

BY ANNE FLETCHER

288 PP • GLOUCESTERSHIRE: AMBERLEY PUBLISHING, 2022 • ISBN-10: 1445693763 • ISBN-13: 978-1445693767 • $29.95

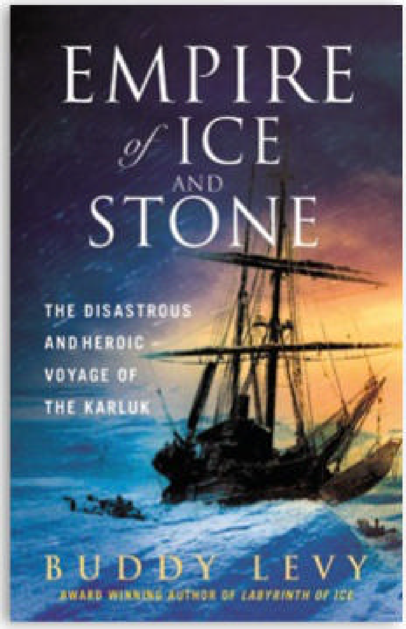
In 1910, Captain Robert Falcon Scott set sail from England bound for Antarctica to lead the British expedition to the South Pole. A race was on as a Norwegian team, led by Roald Amundsen, was on a quest to be the first to reach the bottom of the world. By the time Scott and his four companions reached the pole on January 17, 1912, it was clear the Norwegians had beat them to it. Scott and his men would perish during their grueling return to basecamp—their bodies and journals found eight months later. They were lauded as tragic heroes, but what happened to the families of the men? That is the subject of Anne Fletcher's new book, *Widows of the Ice*.

From the moment the British public learned the fate of Scott and his companions—Edward Wilson, Edgar Evans, Henry Bowers, and Lawrence Oates—Fletcher says, "Scott and his comrades passed into immortality, their deaths a formative moment in the life of the nation." Three of the men had been married. And it is their widows—Kathleen Scott, Oriana Wilson, and Lois Evans—who are the focus of the book, women Fletcher calls the "forgotten wives" who were thrown together but for a brief time, "shaping one of the most famous stories in British history."

Oriana Souper, a well-to-do Victorian girl, met young Edward "Ted" Wilson in 1897 and they were engaged two years later. Despite Ted's suffering from tuberculosis, he went on to finish his studies and then applied for the first Antarctic expedition, necessitating at least a two-year absence from Oriana. He would go on to join other expeditions, living apart from his wife, their love kept aflame through letters. Lois Beynon was from a small Welsh village and worked alongside her parents in a local pub. She met her cousin Edgar Evans in 1904 when his ship *Discovery* docked near town, and was swept away by the dashing young naval officer. Marriage and babies quickly followed. Kathleen Bruce, who was from an eccentric and well-traveled family, had studied with the French sculptor Auguste Rodin before marrying the older Robert "Con" Scott in 1908.

Fletcher chronicles their trials and tribulations after learning of their husbands' deaths and outlines how their disparate social backgrounds contributed to often-difficult encounters.

Making excellent use of troves of letters and diaries, Fletcher creates a wonderful story out of the lives of these three women, so impacted by Antarctic exploration.



EMPIRE OF ICE AND STONE

BY BUDDY LEVY

432 PP ▪ NEW YORK: ST. MARTIN'S PRESS, 2022 ▪ ISBN-10: 1250274443 ▪ ISBN-13: 978-1250274441 ▪ $29.99

Buddy Levy's *Empire of Ice and Stone* is a dramatic tale of the Canadian Arctic Expedition of 1913–1916 that focuses on one of the ships of that expedition—the *Karluk*—and the disasters that befell its crew.

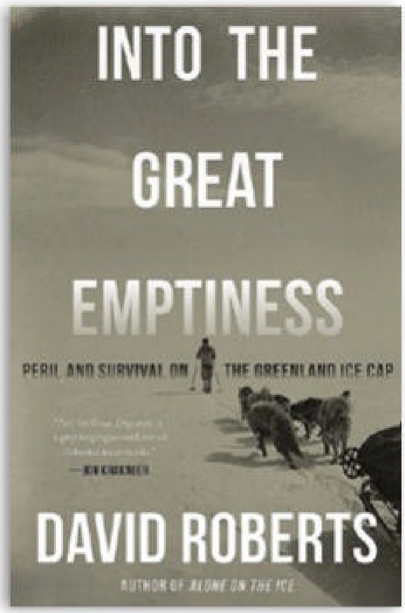
The story begins with noted polar explorer and author Vilhjalmur Stefansson, who had a vision for a large exploratory venture in the western Canadian Arctic, comprising three ships that would spread out and survey different unexplored regions. Media savvy, Stefansson used as a hook a quest for the "blonde Eskimo"—to locate a supposed lost race of white Inuit—to raise money and to secure magazine commissions for himself.

He asked Captain Robert Bartlett to helm the *Karluk*, the flagship of the expedition. Bartlett was a seasoned polar explorer, having led more than 40 expeditions to chart Arctic waters. It was his expertise that would enable some of the men to survive the disaster that they would soon endure.

Stefansson's eagerness to return to the far north led to a hurried departure. Sloppy loading of the ships resulted in items meant for one ship and the work of its scientists ending up on another. Crucially, Stefansson did not take the time to properly outfit the men in clothing that would help them survive in the subzero temperatures they were to encounter.

Problems began not long after the ships weighed anchor at Nome. Soon after her departure from Point Barrow, *Karluk* became trapped in ice and eventually began to drift westward, across the Beaufort and Chukchi seas. With stores running low, Stefansson told the crew he was setting off across the ice with two of their Inuit hunters to find fresh game for the larder, only to never return. The scientists and crew made the best of a very bad situation. Bartlett knew the ship was eventually going to be crushed by the ice and they would have to try to make land if they were going to survive.

Levy tells the incredible tale of the genius of Bartlett leading his unseasoned crew over the ice to Wrangel Island in the dead of winter, and then of his own desperate 700-nautical-mile journey over the ice to Siberia to try to find help to rescue the survivors, vividly bringing this harrowing tale to life. Levy also discusses the post-expedition acrimonious encounters between Stefansson and Bartlett—both men members of The Explorers Club.



INTO THE GREAT EMPTINESS

BY DAVID ROBERTS

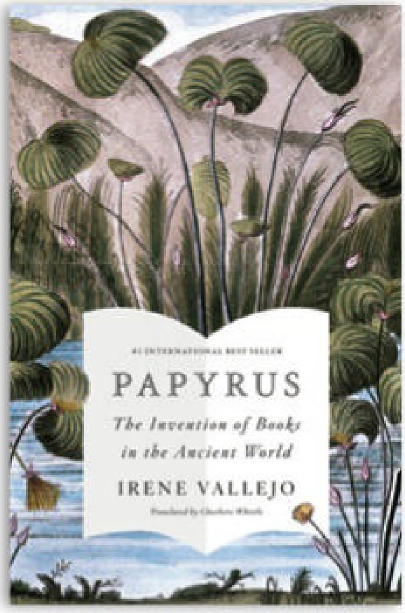
368 PP ▪ NEW YORK: W.W. NORTON, 2022 ▪ ISBN-10: 0393868117 ▪ ISBN-13: 978-0393868111 ▪ $30

Into the Great Emptiness: Peril and Survival on the Greenland Ice Cap is sadly David Robert's last book. The prolific climber and award-winning author of some 30 books on mountaineering, anthropology, and exploration, died of throat cancer in 2021. The last story he decided to tell was about the epic 1930–31 English expedition, led by 23-year-old Henry George Watkins, to chart the east coast of Greenland and establish a meteorological station on its ice cap. At the time very little, if anything, was known about the atmosphere above the ice caps, but it was believed they held the "key to strange ocean currents that swept the Atlantic" and beyond. It was also essential for transmitting atmospheric information to pilots of fledgling airlines who were beginning to make long-distance flights.

The expedition was manned by 14 young men, mostly from Cambridge University, only one of whom had been to Greenland before. Once the team had established the "station"—little more than a domed tent—the two-person team left to man it was supposed to be relieved every three months. That was not to be. The first relief team barely made it to the station through the winter storms, only to realize its supplies could support just one person for the next three months. The second relief team simply could not find the tent. Meanwhile, the single operator, August Courtlaud, had become completely entombed in his tent watching his meager food supply dwindle as the time for the arrival of the relief team came and went.

Roberts does a wonderful job fleshing out the meager information about Watkins's early life—his matriculation through repressive boarding schools and later at Cambridge, where he developed a love of climbing. At age 20, Watkins led his first expedition to survey Edgeøya, an island to the southeast of Svalbard. This was followed by an expedition, backed by the Royal Geographical Society, to map the Newfoundland/Labrador border, during which Watkins and his teammates took three arduous seasons to canoe and tramp through the wilderness. A record of this expedition was published after Watkins's death by teammate Jamie Scott.

The bulk of Robert's book is taken up with chronicling the exploits and interdynamics of the long expedition across and around Greenland. It is fitting that his last book was recording a precocious, yet little remembered, Arctic explorer who blazed briefly in polar exploration pantheon, one whom Roberts says deserves to be remembered. And with this fine tribute, he will.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PAPYRUS
The Invention of Books in the Ancient World
IRENE VALLEJO

PAPYRUS

BY IRENE VALLEJO

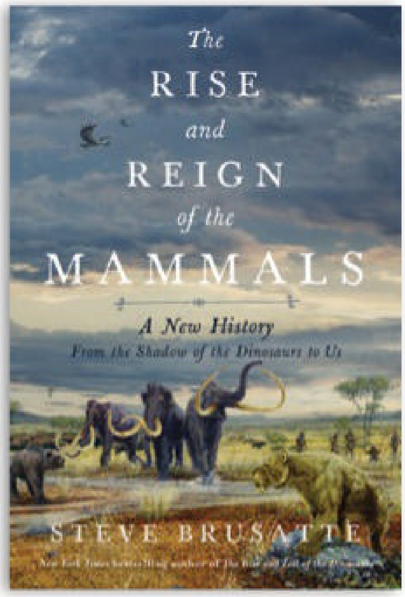
464 PP ▪ NEW YORK: KNOPF, 2022 ▪ ISBN-10: 0593318897 ▪ ISBN-13: 978-0593318898 ▪ $35

"Every library is a journey, every book a passport," writes Irene Vallejo in *Papyrus*, adding that, in antiquity, manuscripts were considered more precious than jewels. Spinning stories that come down to us on manuscript fragments, she weaves a brilliant tapestry of the life of knowledge thousands of years ago and how what became books laid the foundation of our modern society. She calls books our "most valuable creations: words, which are scarcely a puff of air: the stories we tell to give meaning to chaos and survive it."

Vallejo begins with the magnificent story of the founding of the Great Library of Alexandria, by

Ptolemy II Philadelphus, and the literal lengths and extravagant costs the subsequent Greek rulers of Egypt went to to bring together in one place all the knowledge of the world until its destruction during the seventh-century CE Arab invasion. Roman libraries were founded from the spoils of war from the 168 BCE conquest of Macedonia. The haul of books sparked a "collecting frenzy" among the Roman elite. All this was possible because of a miraculous invention in the third millennium BCE—scrolls made of papyrus. Papyrus grew almost exclusively in Egypt and scrolls made from papyrus reeds were also exclusive to Egypt, becoming a valuable export. While papyrus revolutionized the written word, it was also fragile, fire being its worst enemy—followed by humidity and insects. Ironically, cuneiform tablets, which comprised the first archives, have survived in excellent shape because they were literally baked in the fires that consumed their civilization.

Vallejo discusses the origin and impact of the invention of the Latin alphabet beginning in the eighth century BCE, where "the act of writing lengthened the life of memory," leading to a democratization of knowledge in which writing could be shared beyond the hands of the scribes. She also sprinkles her text with intriguing stories of lost love and doomed dynasties, as well as recipes, incantations, funeral inscriptions, and more that have survived the millennia, creating a "tapestry of echoes" that mirror the intricate and ever-expanding vagaries of the mind.



THE RISE AND REIGN OF THE MAMMALS

BY STEVE BRUSATTE

528 PP ▪ NEW YORK: MARINER BOOKS, 2022 ▪ ISBN-10: 0062951513 ▪ ISBN-13: 978-0062951519 ▪ $29.99

Paleontologist Steve Brusatte has followed his previous work, the acclaimed *Rise and Fall of the Dinosaurs*, with *The Rise and Reign of the Mammals*. This book is a tour de force, charging through 350 million years of mammalian history, which began as warm-blooded creatures "scurried in the shadows of dinosaurs" until "a killer asteroid created a new world of evolutionary opportunity" some 66 million years ago.

Years of searching for fossils all over the world to untangle the stories of the evolving mammals has helped Brusatte, his students, and colleagues build a picture of the history of mammals, currently some 6,000 species strong. During the time of the dinosaurs, most mammals were the size of rats, "exploiting ecological niches the dinosaurs could not access." Mammals were "scurriers, climbers, diggers, swimmers, gliders" that developed the classic mammalian blueprint—hair, a warm-blooded metabolism, complex teeth, and mammary glands. When the asteroid smashed into the Earth, it wiped out 75 percent of mammals but, as Brusatte writes, it presented "their moment of greatest peril and their big break."

Brusatte is a great storyteller whose infectious curiosity permeates the book. He brings to life the often-strange variety of early mammals such as whales that walked, elephants the size of poodles, murderous hell pigs, and armadillos as big as buses, sharing details of their lives, their environments, their deaths, and eventual emergence as new and different species, eventually including humans.

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WHAT WERE THEY THINKING?

GREAT MOMENTS IN EXPLORATION AS TOLD TO JIM CLASH

deep thoughts with Don Walsh

NAVY LIEUTENANT DON WALSH (LEFT) AND SWISS ENGINEER JACQUES PICCARD IN A SELFIE TAKEN AT THE BOTTOM OF CHALLENGER DEEP ON JANUARY 23, 1960. IMAGE COURTESY U.S. NAVAL INSTITUTE.

DON WALSH IS A LIVING LEGEND. MENTION THIS TO HIM, AND HE JUST LAUGHS. "THERE ARE A WHOLE LOT OF PEOPLE OUT THERE WHO'VE DONE A WHOLE LOT MORE THAN I HAVE, AND THEY NEVER GET RECOGNIZED," HE SAYS. "I HATE TO TELL YOU, BUT YOU'RE REALLY IN THE PRESENCE OF A FRAUD."

NOT! ON JANUARY 23, 1960, WALSH AND THE LATE JACQUES PICCARD TOOK THE BATHYSCAPHE *TRIESTE* TO CHALLENGER DEEP IN THE MARIANA TRENCH—AT 11 KILOMETERS DOWN, THE DEEPEST POINT ON EARTH. IT WOULD BE MORE THAN HALF A CENTURY BEFORE HUMANKIND WOULD REACH THE DEEP AGAIN—IN 2012, WHEN FILMMAKER JAMES CAMERON DID IT SOLO. BUSINESSMAN VICTOR VESCOVO FOLLOWED IN 2019, AND HAS SINCE TAKEN MYRIAD OTHERS DOWN IN HIS SUBMERSIBLE, DSV *LIMITING FACTOR*. WE RECENTLY CHATTED WITH WALSH ABOUT HIS DIVE, AND TO OPINE ON MORE RECENT "TOURIST" DIVES, FOR WHICH VESCOVO HAS REPORTEDLY CHARGED $1 MILLION A POP.

……

JC: Nearing the bottom, what did you see?
DW: Piccard was at the window, and I was at the Fathometer, calling off distances to the seafloor as we slowed. Just before we landed, he said, "There's a fish. Come look." It looked like a flatfish, a flounder or halibut or sole, with two eyes on the top. But we were two engineers, not biologists [laughs]. What we probably saw was a *Holothuria*, a sea cucumber, an invertebrate. We did see lots of jellyfish, shrimp, and things of that sort close to the bottom, but nothing with a skeleton. You can't find a high order of vertebrate much past 8,500 meters because of the pressure.

JC: What scares you?
DW: Attack penguins make me nervous [laughs]. No, but I'm afraid of heights even though I am a pilot. But up there, in a plane, you don't sense the height.

JC: Speaking of fear, didn't you experience an anomaly on the way down in 1960?
DW: Yes, we heard a loud crack at about 9 kilometers down. Clearly, it was not a pressure breach, otherwise we'd have been dead instantly. At the bottom, we found a crack in the acrylic pane, which allowed us to see what was in back of the sub. We knew it was not an immediate problem, so we stayed on schedule, about 20 minutes at the bottom.

JC: Your thoughts on the recent "tourism" effort down there.
DW: I think it's pretty benign. Victor's burn rate was about $1 million per month just to keep his scientific program alive. So, if he had spare capacity—that is, if he didn't have a scientist to fill a seat for a certain dive—he would take someone else. That someone, in essence, helped fund the science aspects. If these people wanted bragging rights, that's okay as far as I am concerned.

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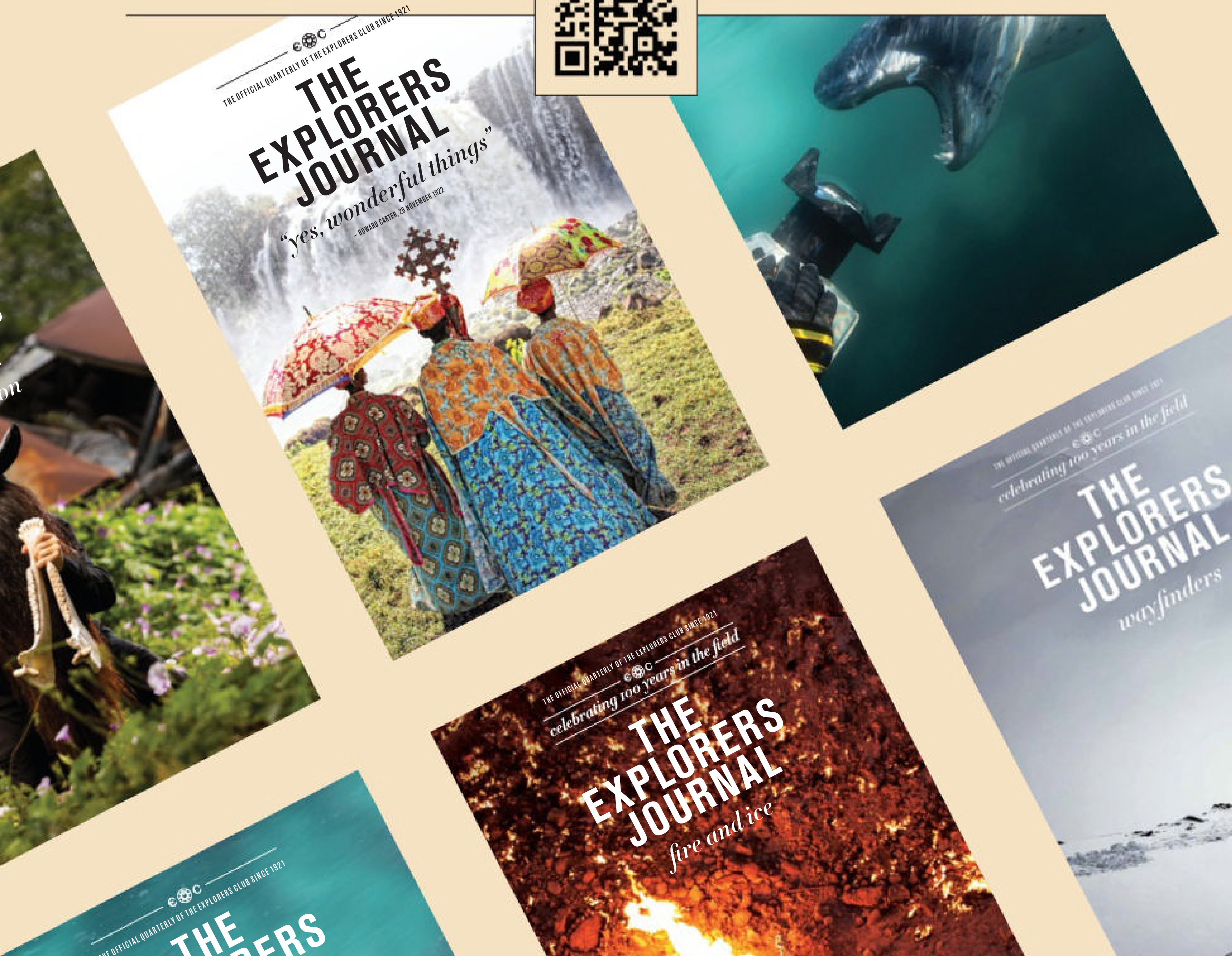
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—HOWARD CARTER, 26 NOVEMBER 1922
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THE

THE OUTER SEYCHELLES

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THERE ARE OVER 130 HOPE SPOTS GLOBALLY

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OYSTER PERPETUAL ROLEX DEEPSEA

ON OUR WATCH

Hope can now be spotted across all our planet's seas and oceans. Sites are made into aquatic havens by local communities, to safeguard the richness and diversity of the ecosystems they depend on. Sylvia Earle's invaluable experience as an explorer and marine biologist continues to help further their goal, through her organization, Mission Blue. Together, they have created over 130 Hope Spots and counting. Carrying a message of hope for generations to come. It is that vision, that dedication to a perpetual planet, which we are proud to stand by. **For as long as it is needed.**

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